



# Emergency Response Action Plan

Superior Region (#866) Response Zone



Version 1  
2013

**Acknowledgements:**

**Significant contributions in the creation of this ICP were made by the staff of:**



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## 6.0 Emergency Response Action Plan Review and Update Procedures

The purpose of this Emergency Response Action Plan (ERAP) is to provide quick access to key types of information that are often required in the initial stage of a spill response. The information provided in this ERAP is presented in greater detail in other sections of the plan. The ERAP will be updated and redistributed annually unless there is a regulatory change that impacts the plan.

Reviewing and updating the ERAP shall be the responsibility of the Emergency & Security Management Department. This ERAP is updated annually.

Emergency Responders can find additional information on the Enbridge system at [www.EnbridgeUS.com/ERinfo](http://www.EnbridgeUS.com/ERinfo).

## 6.1 Response Zone Description (Information Summary)

The Superior Region Response Zone consists of two entities: Enbridge Energy, Limited Partnership and Enbridge Pipelines (Southern Lights) L.L.C. This response zone begins at the Canadian border near Neche, North Dakota and continues across northern Minnesota into Wisconsin and Michigan. The first section of this response zone includes seven pipelines (Lines 1, 2, 3, 4, 13, 65, and 67) that transport crude oil and natural gas south and diluent condensate north. The response zone continues south of Superior to the U. S. Highway 8 crossing near Ladysmith, WI with four pipelines (Lines 6A, 13, 14, and 61) transporting crude oil and diluent condensate from the Manhattan Terminal in Illinois. A 30-inch pipeline (Line 5) originates in Superior, WI that transports crude oil and natural gas liquids east across northern Wisconsin, the Upper Peninsula of Michigan and into lower Michigan with the Superior Region ending south of Indian River, MI.

The Superior Region encapsulates the lines between the following coordinates:

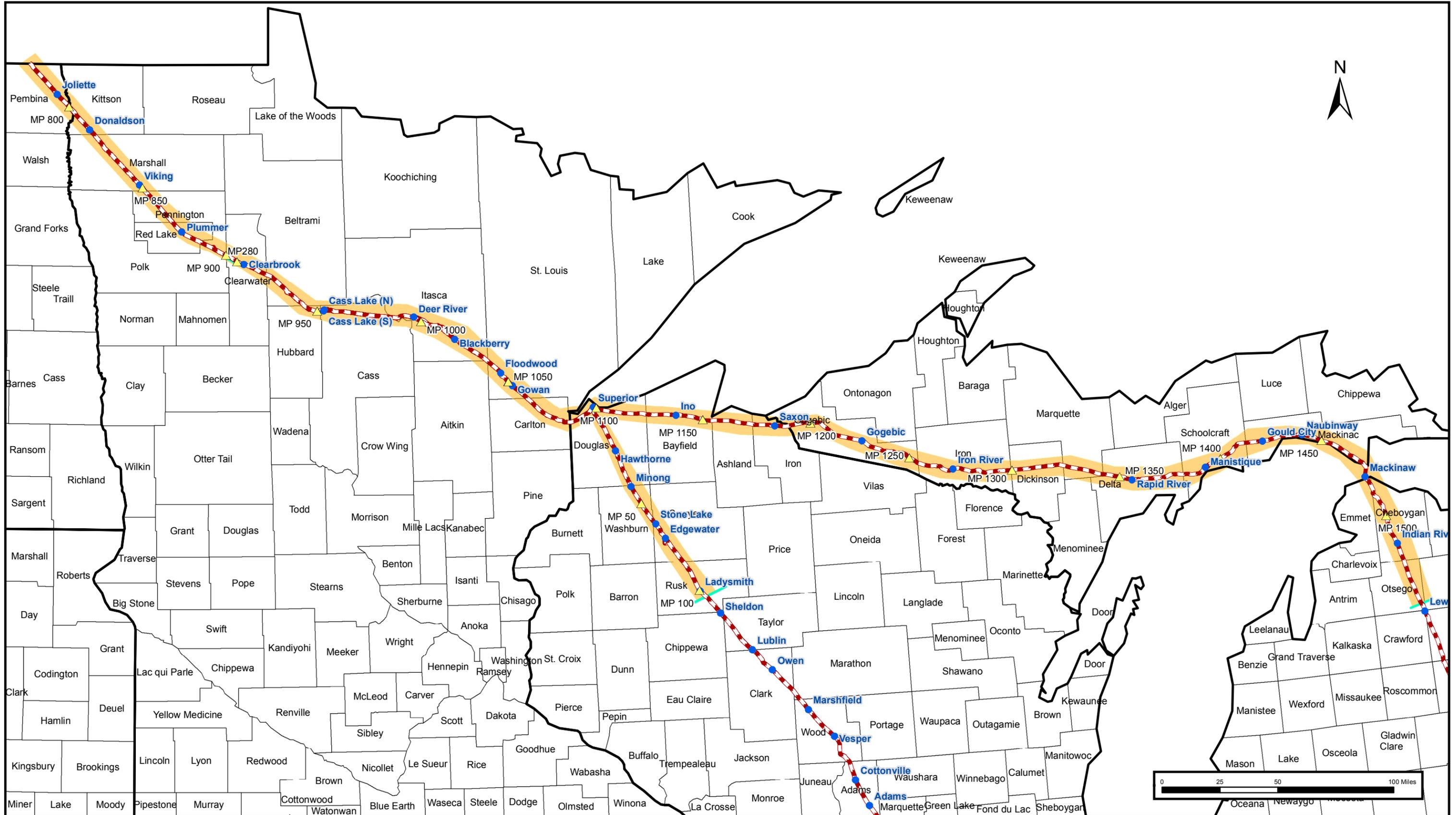
Line	Pipeline Section	Begin Lat	Begin Long	End Lat	End Long
1	Gretna, Manitoba to Superior, WI	██████	██████	██████	██████
2	Gretna, Manitoba to Superior, WI	██████	██████	██████	██████
3	Gretna, Manitoba to Superior, WI	██████	██████	██████	██████
4	Gretna, Manitoba to Superior, WI	██████	██████	██████	██████
So. Lights 13	Gretna, Manitoba to Superior, WI	██████	██████	██████	██████
So. Lights 13	Superior, WI to U.S.Hwy 8 (Ladysmith, WI)	██████	██████	██████	██████
Alberta Clipper 67	Gretna, Manitoba to Superior, WI	██████	██████	██████	██████

Line	Pipeline Section	Begin Lat	Begin Long	End Lat	End Long
5	Superior, WI to Lewiston Pump Station, MI	██████	██████	██████	██████
6A	Superior, WI to MP97.23- U.S.Hwy 8 (Ladysmith, WI)	██████	██████	██████	██████
14	Superior, WI to MP97.23- U.S.Hwy 8 (Ladysmith, WI)	██████	██████	██████	██████
61	Superior, WI to MP97.23- U.S.Hwy 8 (Ladysmith WI)	██████	██████	██████	██████
LSr (65)	Gretna, Manitoba to Clearbrook, MN	██████	██████	██████	██████

The Superior Region system is comprised of:

- Approximately 2,937 miles of pipeline, with pipe diameters ranging from 18 to 48 inches;
- 24 pump stations located along the pipe; and
- Two terminal facilities with a total of 49 tanks (40 tanks are located at Superior, WI (8,728,000 barrels storage capacity); 9 at Clearbrook, MN (1,312,000 barrels storage capacity), along with pump stations within the terminal facilities.

The following page is the Regional County Map for the Superior Region. For further pipeline assistance visit: <https://www.npms.phmsa.dot.gov/>



### Regional County Map Superior Region

Legend

- ▲ Milepost
- Enbridge Station
- Superior Region
- Pipeline
- Region Boundary

Scale 1:2,400,000



## 6.2 Initial Response

Immediate actions are required at the onset of an emergency response to mitigate the extent of a release, minimize the potential hazard to human health and the environment, as well as implement an effective response.

### 6.2.1 Required Notifications

The following actions are to be taken for the initial response and notifications. They are not meant for sustained operations. In the event the response efforts go beyond these initial stages response procedures, then the Enbridge ICP and its corresponding geographical annex will be utilized.

Any person who observes or becomes aware of a release shall immediately report the incident to the Person in Charge. The initial field notifications are as follows:

1. Notify Person In Charge.
2. Notify the Company 24-hour Control Center.
3. Call 911 or local emergency phone number for the jurisdiction affected by the incident.
4. Utilize ICS 214a – Individual Log to document information and to log notifications. Provide the following information regarding the incident, when making internal notifications:
  - Brief description of the incident, including the location;
  - The impact or potential impact; and
  - Contact name and telephone number to obtain follow-up information.

Edmonton Control Center	
Contact Type	Information
Local/Long Distance Phone Number	780-420-5221
24 Hr. Toll-Free Phone Number	<b>800-858-5253</b>

In the normal course of events the Control Center should notify the Qualified Individual (QI). However there may be instances where the initial responder needs to notify the QI. See Company Emergency Response Directory (ERD) for QI numbers.

It is the QI's responsibility to first make the appropriate notifications, then to initiate response operations. This individual has absolute authority to obligate any funds necessary to carry out all required and/or directed response activities. This individual will also act as liaison with Federal, State and local agencies and serve as the On-Scene Incident Commander. The Response Zone QI and Alternate are identified in Annex 2.

The following checklist (the checklist is not all inclusive) serves as a guide to the On-Scene IC/QI.

The Minimum Duties Required Of The QI Include:	
✓	Notify all response personnel and OSROs, as needed
✓	Notify and provide necessary information to appropriate Federal, State, and local authorities with designated response roles, including the National Response Center (NRC), State Emergency Response Commission (SERC), and Local Emergency Planning Commission (LEPC)
✓	Assess the possible hazards to human health and the environment as a result of the release. This assessment must consider both the direct and indirect effects of the release (i.e., the effects of any hazardous surface waters runoffs from water or chemical agents used to control fire and heat-induced explosion)
✓	Assess and implement prompt removal actions to contain and then remove the substance released
✓	Coordinate rescue and response action as previously arranged with all response personnel
✓	Use authority to immediately access company funding to initiate response, mitigation and clean-up activities
✓	Provide comprehensive emergency response and incident mitigation information for all hazardous material being transported as described under 49CFR§172.604. Emergency response telephone number, including the area code can be found in Annex 2.1.3 Enbridge QI Notifications.

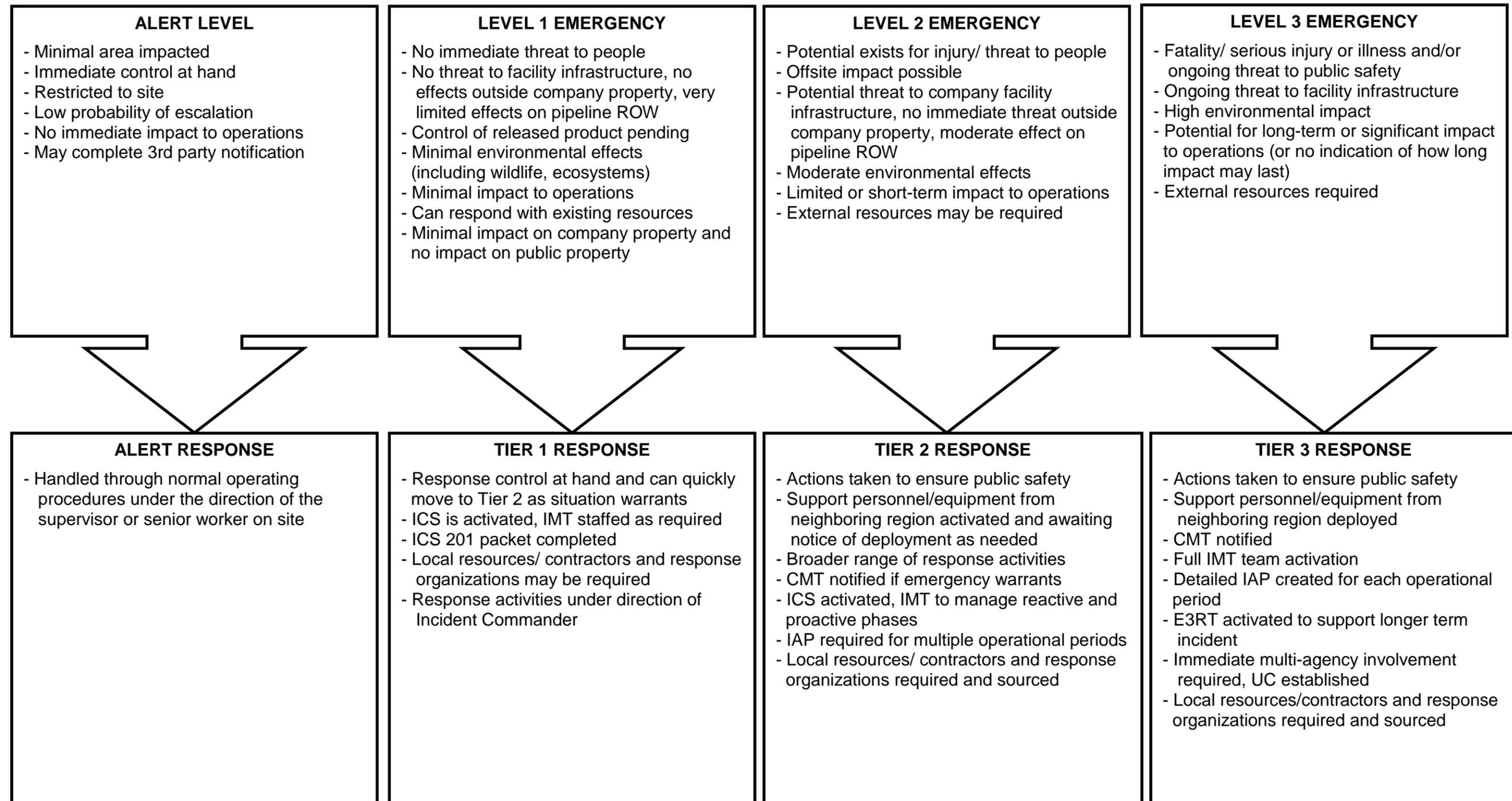
In most instances notifying government officials of an incident would be performed by someone other than the initial responder. However there are always exceptions. In that event, the National Response Center (NRC) contact telephone number is listed below.

	<b>National Response Center</b>	<b>800-424-8802</b>
<p>If you have a spill/release to report, contact the NRC via the toll-free number or visit the NRC Web Site (<a href="http://www.nrc.uscg.mil">http://www.nrc.uscg.mil</a>) for additional information on reporting requirements and procedures. Refer to Annex 2 Notifications.</p>		
<p><b>Reporting Requirements</b></p>		
Type	All spills that impact or threaten navigable water or adjoining shorelines	
Verbal	Within 1 Hour of release and again with follow-up information on significant changes within 48 hours	
Written	As requested by the agency	

See section 6.10 Forms for NRC questionnaire.

6.2.2 Company Emergency Classification and Tiered Response

**FIGURE 1  
EMERGENCY CLASSIFICATION AND TIERED RESPON S**





**Enbridge (U.S.) - Required Release Notifications**

*In the event of a release on our pipeline system or at our facilities, the following shall serve as a guide for initial notification/reporting required within the first 24-hours, or sooner where noted. As Federal, State and Internal criteria all differ, each box must be independently reviewed to ensure all notifications are made.*

**EMERGENCY NOTIFICATION RESPONSIBILITIES**

PERSONNEL	FUNCTION	INFORMATION SOURCE	RESPONSIBILITIES
<b>ENBRIDGE EMPLOYEE</b>	Communicates possible emergency.	Public notification or observed incident.	<ul style="list-style-type: none"> <li>- <b>RECORDS</b> information on the Receiving Emergency Information Form.</li> <li>- <b>GIVES</b> caller precautions and instructions (found after the Receiving Emergency Information Form), as required.</li> <li>- <b>ALERTS</b> pipeline control centre</li> <li>- <b>TAKES</b> appropriate field action.</li> </ul>
<b>QUALIFIED INDIVIDUAL</b>	Coordinates verification, management, communication, and field response activities.	Control Centre Operations	<ul style="list-style-type: none"> <li>- <b>RECORDS</b> information on log.</li> <li>- <b>ENSURES</b> Enbridge Responder has been dispatched to verify report. Stresses safety precautions.</li> <li>- <b>ENSURES</b> Emergency Response (Police, EMS, Fire) have been notified. Provides same with updated information and confirms whether assistance is needed.</li> <li>- <b>CONFIRMS</b> whether Enbridge or Public personnel require evacuation.</li> <li>- <b>ENSURES</b> that the appropriate Supervisor, PLM Services/Crew have been alerted.</li> <li>- <b>PROCEEDS</b> to Regional Office or command post.</li> <li>- <b>CALLS</b> Vice-President, Operations or designee.</li> <li>- <b>MAINTAINS</b> contact with verifier and Control Center.</li> <li>- <b>MAKES</b> a decision when it is safe to consider the emergency under control and authorize action (restart line, recall verifiers, etc.)</li> <li>- <b>COORDINATES</b> additional verification efforts as necessary.</li> <li>- <b>INVOKES</b> the Emergency Response Plan.</li> <li>- <b>ALERTS</b> other pipeline companies if/when required.</li> <li>- <b>NOTIFIES</b> appropriate Government agencies (including the TSB/DOT), as required.</li> <li>- <b>COMPLETES</b> Release Alert.</li> </ul>



**INTERNAL COMPANY NOTIFICATIONS**

**INITIATE THE NOTIFICATION PROCESS**

**Procedure:** If an Enbridge employee outside of the control center is the first person to discover or receive the initial call on a release, they need make only one call that serves to secure a line shutdown, initiate a response and initiate proper internal notification.

CONDITION	WHO TO NOTIFY
1. A release of any quantity requiring an operating change/shutdown, or 2. An outside caller reports a suspected or confirmed release	Contact: Edmonton Control Center immediately - Liquids (U.S.) <b>800-858-5253</b> Alternate Number: <b>780-420-5221</b> Gas <b>888-427-7777</b>  Contact: Notify Regional On-Call Manager Regional On-Call Manager will notify Qualified Individual
1. A release or spill of crude oil or hazardous substance occurs that does not require an operating change/shutdown, but meets one of the following criteria: - Any NGL/natural gas release - Any release/spill/contamination meeting state or federal notification requirement (see next page)	Contact: Notify Regional On-Call Manager Regional On-Call Manager will notify Qualified Individual

**CONTROL CENTER ACTION AND NOTIFICATIONS**

**Procedure:** If Control Center receives notification or observes operating conditions where a release is suspected, line operation is terminated and the Control Center initiates and/or continues the notification process by alerting the Qualified Individual or on-call designee. In addition, local law enforcement is notified and assistance requested, if necessary.

CONDITION	WHO TO NOTIFY
1. An Enbridge or outside caller reports a suspected or confirmed release, or 2. An alarm condition necessitates a line shutdown, or 3. The line is shutdown under the 10 minute rule as a result of abnormal operation.	Complete: Receiving Emergency Information Form Contact: Qualified Individual Local law enforcement Other Control Centers Field verifier if authorized by Qualified Individual Consider contacting fire/other public officials (emergency management)

**QUALIFIED INDIVIDUAL (OR DESIGNEE) - CRITERIA FOR INTERNAL NOTIFICATIONS/REPORTING**

**Procedure:** Upon receiving notification of a suspected or confirmed release, the Qualified Individual is responsible for verifying and/or initiating response. Depending upon the specifics of a confirmed release or spill, further internal notifications must be made including a Release Alert. Required external notifications and criteria must also be viewed (see next page) and reported accordingly.

CONDITION	WHO TO NOTIFY
1. Report of a suspected release or spill, or 2. Control Center reports an alarm condition and line shutdown, or 3. The line is shutdown under the 10 minute rule as a result of abnormal operation.	Contact: Nearest verifier Alert: Crews for possible mobilization Consider contacting fire/other public officials (emergency management)
1. A release of any quantity requiring an operating change or shutdown	Mobilize: Crews and contractors as necessary Ensure: Line is shutdown and prior communications are complete Alert: Enbridge Management Complete: Release Alert
1. A release or spill of crude oil or hazardous substance occurs that does not require an operating change /shutdown, but meets one of the following criteria: - Any NGL/natural gas release - Any release/spill/contamination meeting state or federal notification requirement (see next page)	Initiate: Appropriate clean-up activity Complete: Release Alert



**Enbridge (U.S.) - Required Release Notifications (Cont'd)**

**DOT-REGULATED PIPELINE-RELATED SPILLS: EXTERNAL NOTIFICATIONS**

**Qualified Individual (or Designee)- Criteria for External Notifications: Federal Procedure:** Upon verification of a release, the Qualified Individual must make an initial assessment of the situation to determine whether or not the incident requires Federal Notification based on the criteria described below.

CONDITION	WHO TO NOTIFY
<p><b><u>If a failure in the pipeline system in which there is a release of hazardous liquid or gas from its primary containment (pipe or pipe system) including a release captures in secondary containment, results in:</u></b></p> <ol style="list-style-type: none"> <li>1. Unintentional explosion or fire OR</li> <li>2.* Death of any person OR</li> <li>3.* Hospitalization of any person OR</li> <li>4.* Estimated property damage exceeding \$50,000 (including repair, clean-up and cost of product) OR</li> <li>5. Pollution of a water body (rivers/streams/wetland/reservoir) OR</li> <li>6.* Any other event that the Qualified Individual deems significant for other reasons.</li> </ol>	<p><b><u>Then (WITHIN 1 HOUR)</u></b></p> <p>Contact: <b>NATIONAL RESPONSE CENTER (NRC) - 800-424-8802</b></p> <p>Be ready to provide the following:</p> <ul style="list-style-type: none"> <li>- Name and address of Enbridge</li> <li>- Your name and telephone number</li> <li>- Location of the failure with Legal Description</li> <li>- Time of the failure</li> <li>- Fatalities and personal injuries, if any</li> <li>- All other significant facts known at that time</li> </ul> <p>If not asked by the Operator, clarify appropriate pipeline safety regulator (e.g. OPS, Oklahoma Corporation Commission, etc.)</p>
<p><b><u>SIGNIFICANT CHANGES</u></b></p> <ul style="list-style-type: none"> <li>- Increase or decrease in the number of previously reported injuries or fatalities OR</li> <li>- Revised estimate of the product release amount that is at least 10X greater than the amount initially reported OR</li> <li>- Revised estimate of the property damage that is at least 10X greater than amount initially reported.</li> </ul>	<p>Submit a verbal supplemental report to the NRC during the emergency response phase <b>within 48 hours of the incident.</b></p> <p>Contact: <b>NATIONAL RESPONSE CENTER (NRC) - 800-424-8802</b></p>
<p><b><u>If a failure in the pipeline system in which there is a release of hazardous liquid or gas from its primary containment (pipe or pipe system) including a release captured in secondary containment, results in</u></b></p> <ol style="list-style-type: none"> <li>1. Any of the above, or</li> <li>2. Loss of 5 gallons or more of liquid with an exception for spills under 5 barrels resulting from pipeline maintenance activities that did not result in water pollution, spill is cleaned up promptly, and spill is confined to company property or ROW, OR</li> <li>3. Escape of more than 5 gallons of NGL to atmosphere.</li> </ol>	<p><b><u>Then (WITHIN 30 DAYS)</u></b></p> <p>The U.S. Pipeline Compliance Department in Superior, WI, will file a written Accident Report on PHMSA Form 7000-1 (liquids) or Form F7100.2 (gas) for all reportable releases. These reports are due 30 days from the date of the incident. If an internal "Release Alert" is not drafted immediately after the release, please contact the Compliance Department as soon as possible to initiate the process.</p>

**Qualified Individuals (or Designee)- Criteria for External Notifications: State (Crude Oil & NGL\*)**  
**Procedure:** Upon verification of a release, Qualified Individual or designee must make an initial assessment of the situation to determine whether or not the incident requires state notification based on the criteria described below.



**Enbridge (U.S.) - Required Release Notifications (Cont'd)**

State	Water	Release Reporting Criteria Soil	Notification Period	24-Hour Reporting Hotline
Michigan	Visible sheen or emulsion Natural gas	≥ 1 bbls  >1,000,000 scf	Within 24 hours of discovery Within 24 hours of discovery	800-292-4706 (within Michigan) 517-373-7660 (outside Michigan) 800-292-4706 (within Michigan) 517-373-7660 (outside Michigan)
Minnesota	Visible sheen or emulsion	≥ 5 gallons Any release that threatens surface water or groundwater	Immediately upon discovery	800-422-0798 (within Minnesota) 651-649-5451 (outside Minnesota)
North Dakota	Visible sheen or emulsion	No minimum. All releases are reportable that may harm human health or harm the environment.	Immediately upon discovery	800-472-2121 (within North Dakota) 701-328-8100 (outside North Dakota)
Wisconsin	Visible sheen or emulsion	≥ 5 gallons Not reportable if immediately contained and cleaned up, and spilled on competent asphalt or cement (an impervious surface)	Immediately upon discovery	800-943-0003

The state reporting requirements noted in this table were developed by U.S. LP Environment.

NOTE: - Releases should be reported if any one of the reporting criteria are triggered.

- Environment staff in the Superior Office should be contacted for releases reported to regulatory agencies.
- Local reporting requirements (police, EMS, fire department, Coast Guard, etc.) may also apply.
- For releases impacting drinking water HCAs, identify water intakes, wellhead protection areas or other identified HCA DW sources, and notify the local Public Utilities Department (or equivalent) if potential threats exist.

All uncontrolled or accidental NGL releases are subject to immediate notification to the state agencies listed above.

\*\* Contact the Enbridge U.S. Pipeline Compliance Department in Superior, WI (715) 394-1504 to have a DOT form 7000-1 submitted (within 30 days) to the Federal OPS & Pipeline Safety Department, OCC Jim Thorpe Building, Oklahoma City, OK 73105.

**Non-Pipeline Related Spill - - External Notification**

Non-pipeline related spills of oil/petroleum products or hazardous materials may also require external notification. Example non-pipeline spills could include the following:

- Release, failure or spill from a drum or other container of oil, solvent or hazardous material.
- Hydraulic hose or equipment failure.
- Vacuum truck hose or fittings.
- Aboveground or equipment-related fuel storage tanks and containers.

The following reporting guidelines apply:

Petroleum related compounds (oils, gasoline, diesel, used oil, mineral spirits, etc.)	Reporting requirements are the same as provided in the previous tables, except for gasoline in: <b>Wisconsin</b> (>1 gallon if on pervious surface)
Non-petroleum hazardous substances (antifreeze (ethylene glycol), toluene, xylene, methanol, battery acid, etc.)	Reporting requirements vary depending on the material, spill and applicable regulations – <b>Contact Environment Department</b>

## 6.3 Response Equipment

### 6.3.1 Oil Spill Response Organization (OSRO)

Enbridge has an OSRO Master Service Agreement with Marine Pollution Control Corp. This agreement can be found in Annex 2 of the Region ICP. In most instances notifying the Company's OSRO of an incident would be performed by someone other than the initial responder. However, there are always exceptions. In that event, the Company OSRO emergency contact telephone number is below.

The company has response agreements with various OSROs and contractors. These contractors will be activated on an as-needed basis and typically only if the incident requires resources beyond those available from Superior Response Zone.

Oil Spill Response Organization (OSRO)	
Marine Pollution Control Corp (MPC)	1-313-849-2333 (24 hrs.)
Clean Harbor's Environmental Services, Inc.	1-800-645-8265 (24 hrs.)
Garner Environmental Services Inc.	1-800-424-1716 (24 hrs.)
LePier Oil Co., Inc.	1-877-292-8719 (24 hrs.)

### 6.3.2 Local Spill Response Equipment

In addition to the above contracted OSROs and in accordance with the Federal Response Framework and ACPs, Enbridge owns and maintains extensive emergency response equipment throughout its liquid pipeline systems. This equipment is located at area office locations as well as other strategic locations along the system to ensure a prompt containment and recovery response in the event of a pipeline release. It is the responsibility of each Area Supervisor/Maintenance Team Leader to ensure that the equipment is inventoried annually and restocked as resources are expended.

Temporary storage is available via company owned and operated storage and breakout tanks throughout the pipeline system. Recovered product can often be off-loaded at pump stations and re-injected into the pipeline. Numerous portable storage tanks are included in emergency response equipment inventories and in many areas, the company owns and maintains vacuum recovery trucks.

The tables below list the Enbridge owned spill recovery equipment and their capabilities.



PRIMARY WATER RECOVERY EQUIPMENT	Thief River Falls	Bemidji	Superior	Ironwood	Escanaba	Manistique	Indian River	Clearbrook	Gould	St. Ignace	Mackinaw	Total
<b>Boom &amp; Absorbents</b>												
Boom - Containment (Ft.)		680	150									830
Boom Containment -w/Quick Latch Coupling (Ft.)			700									700
Boom – Mini (Ft.)	150	300	150	300	400							1,300
Boom – Open Water			2,100									2,100
Boom – River (Ft.)		250	850	500	500							2,100
Boom – Small (Ft)			150									150
10" Boom Containment (Ft.)		450	550	500	300							1,800
10" Boom w/Quick Latch Coupling (Ft.)						400	400		300			1,100
12" Boom – Long Skirt		100										100
12" Boom Containment (Ft.)	2											2
18" Boom – Long Skirt		350										350
18" Boom -Mini (Ft.)	3,000											3,000
24" Boom w/Quick Latch (Ft.)											1,000	1,000
24" Boom w/Quick Latch (Ft.) & 16" Skirt										1,000		1,000
48" Boom (Ft.)		500										500
48" Boom - Open Water (Ft.)			2,100									2,100
Boom - Anchors - w/ Chains & Rope										5		5
Sorbent Boom (20 Ft. Bale)											4	4
Sorbent Boom				2								2
Sorbent Boom				20								20
Sorbent Boom (Ft.)		560	250		40							850
Sorbent Boom (5" x 10") (Ft.)									200			200
Sorbent Boom (5" x 10")(Bale)						5	5					10
Sorbent Boom (6" x 10")(Bale)										2		2
Sorbent Boom (8" x 10") (Ft.)			780						200			980
Sorbent Boom (8" x 10")(Bale)						5	5			2		12
Sorbent Boom 3"					2			28				30
Sorbent Boom 5" (Ft.)		640										640
Sorbent Boom 6" (60 Ft\Bag) (Ft.)					240							240
Sorbent Boom (6"x10") x 4 (Ft.)				40								40
Sorbent Boom (8" x 10") x 80		80						5				85
Sorbent Boom (15" x 8") x 4 (Ft.)			40									40
Sorbent Boom 15" (Ft.)				200	280							480
Sorbent Boom 15" (Bags)			25									25
Sorbent Boom		24										24
Sorbent Boom (100/ Bundle)			7									7
Absorbent Cellulose Bag			5									5
Sorbent Pad - Bundle		10	13									13
Sorbent Pads – (100/)		34			21			7			3	58
Sorbent Pads – (17" x 19")(100/)		24		5		1	1		2	1		34
Sorbent Pads – (17" x 19")(200/)						1	1		1			3
Sorbent Pads (100 / Bag)		2	7	3								12
Sorbent Pads (ea.)				800	700							1,500
Sorbent Roll 38" x 144' (Rolls		2	1	2						1	2	8
Sorbent Pad 16" X 20" (100 Bag)			50									50
Sorbent– Sweep/roll (20" x 100')		2	1	2	6					1	2	14
Sorbent– SPC Sweep					2							2



PRIMARY WATER RECOVERY EQUIPMENT	Thief River Falls	Bemidji	Superior	Ironwood	Escanaba	Manistique	Indian River	Clearbrook	Gould	St. Ignace	Mackinaw	Total
<b>Skimmers</b>												
Skimmer , UM04810025, 48" (35 Gal/Min)		1										1
Skimmer , UN35810088 96" (70 Gal/Min)		2										2
Skimmer , UN3581008 96" (70 Gal/Min)		3										3
Skimmer - Manta Ray, 36", (120 Gal/Min)		2										2
Skimmer - Manta-Ray Floating Suction Head Model No. 1800 - S/N 937					1							1
Skimmer - Mini Max, 48"(255 Gal/Min) Model MM00211		2										2
Skimmer – Oil, 48"			1									1
Skimmer – Oil, 96"			1									1
Skimmer Drum, TDS11802387, 48" (35 Gal/Min)		1										1
Skimmer Drum , TDS11802386, 48" (35 Gal/Min)		4										4
Skimmer Drum , (20 Gal/Min)												
Skimmer Drum , 36" (20 Gal/Min)	2											2
Skimmer Drum , 96" (70 Gal/Min)												
Skimmer Drum , 48" (35 Gal/Min) S/N UN340611056 - Hyd. S/N TDS11984441 – Hyd. S/N TDS1362491 - Air					3							3
Skimmer Drum , UN04810024 (35 Gal/Min)				1								1
Skimmer Drum , UN35810024 (70 Gal/Min)				1								1
Skimmer-Grooved Drum, UN340G12062 (9.5 Gal/Min)				1								1
Skimmer - Power Pak, Hydraulic, Model 2482-TT02 SIN KU31011047					1							1
Skimmer – Power – Pak, Air S/N PDA2591					1							1
Skimmer – Skim Pak		2			1							1
Skimmer Weir												2
<b>Pumps</b>												
2" Air Operated Pump			2									2
2" Electric					2							2
2" Air Operated + Hoses					2							2
2" Mud Sucker					1							1
3" Air Operated			3	1						1	1	6
3" Air Operated + Hoses		4	2	1	2							9
2" Diaphragm Pump								1				1
1" Diaphragm Pumps								1				1
3" Hydraulic , 8 HP		4										4
3" Hydraulic			1		1							2
3" Hydraulic + Hoses		3										3
4" Hydraulic , 8 HP			3									3
4" Hydraulic + Hoses, 8 HP, Hydraulic Pump - Submersible	2	3		1	1							6
2" Trash Pump, 5.5 HP )		2										2
2" Trash Pump			7									7
2" Trash Pump + Hoses		2										2
3" Trash Pump , Model QP301TA				2	2							4
3" Trash Pump, 8 HP, (425 Gal/Min)		2										2
3" Trash Pump (205 Gal/Min)		4										4
3" Trash Pump + Hoses		3	2	2								7
2 ½" Fire Hose (50' Rolles)								20				20



PRIMARY WATER RECOVERY EQUIPMENT	Thief River Falls	Bemidji	Superior	Ironwood	Escanaba	Manistique	Indian River	Clearbrook	Gould	St. Ignace	Mackinaw	Total
<b>Pumps</b>												
1 ¼" Fire Hose (50' Rolls)								5				5
3" Suction Hose (10' Piece)								2				2
2" Suction Hose (10' Piece)								1				1
3" Discharge Hose (50' Rolls)								2				2
2" Discharge Hose (50' Rolls)								3				3
<b>Trailers</b>												
Trailer Boom	1	1	1	1	1	1	1		1	1	1	10
Trailer PLM Boom	1		1	1								3
Trailer PLM Leak			1									1
Trailer Boom - 220		1										1
Trailer Command Post	1											1
Trailer Decontamination					1							1
Foam Trailer 300 Gal								1				1
Trailer Leak	1	1	1		1							4
Trailer Leak – 109		1										1
Trailer Leak - 292		1										1
Tow Bridle					2		4		4	1	1	12
<b>Equipment</b>												
Generator – 700 watt, SN EAKJ1002370		1										1
Generator – 1000 watt, Worn Out					1							1
Generator – 1000 watt	1											1
Generator – 1000 watt, SN GC03-1129472				1								1
Generator – 2500 watt										1	1	2
Generator – 3000 watt, SN Ezgf1146536		2										2
Generator – 3500 watt, SN Ezgf1005551		1										1
Generator – 3500 watt, SN SNN27041G2RA					1							1
Generator – 3500 watt, SN GC04-3370574				1								1
Generator – 3500 - 10000 watt,			3									3
Generator – 3500 , SN EAS115524		2										2
Generator – 4000 watt, SN HN1760006				1								1
Generator –Honda – 3500 watts, Model - EM35005 S/N EAG-1114682					1							1
Generator – Honda –11000, SN P0602140028				1								1
Ice Auger – Powered 6"	1			1								2
Ice Auger – Powered 8"		1	1	1	1							4
Ice Auger with Extension	1				1							1
Power Unit Motor Manual w/Tools					1							1
Port-a-Tank and Liner (1,800 Gal)		1		1	1							3
Shelter		1	1	1								3
Quick Tent				1								1
Fast Tank Saddle Assembly										1	1	2
Purple K Fire Extinguisher Agent 50#								13				13
3%-6% Foam (55 Gal. Barrel)								1				1
Tank Rescue Equipment								1				1

PRIMARY WATER RECOVERY EQUIPMENT	Thief River Falls	Bemidji	Superior	Ironwood	Escanaba	Manistique	Indian River	Clearbrook	Gould	St. Ignace	Mackinaw	Total
<b>Equipment</b>												
30-Minute Scott SCBA's								3				3
Escape Packs								5				5
Chainsaw	2		2	2								6
Chainsaw with Ice Blades	2											2
Chainsaw Bar					1							1
Chainsaw 20"		1										1
Chainsaw 24"					1							1
Chainsaw 36"		1										1
Winch	1	1	1	1	1							5
Winch Portable					1							1
BTU Heaters (150,000 btu)				2								2
Buoys Markers w/Lights										5		5
<b>Vehicles</b>												
Truck Vacuum, (1,695 Gal) vin #: 1HTSDAAN7TH275676				1								1
Truck Vacuum, (1,800 Gal)					1							1
Truck Vacuum , 08-138, (2500 Gal)		1										1
Truck Vacuum (2,500 Gal)	1	1										2
Truck Vacuum (3,300 Gal) ,			1									1
Boat – Lund W/Trailer – 18 Ft.							1					1
<b>Storage</b>												
Storage- Tank – Portable (1,800 Gal)		1		1	1							3
Tank Storage (5,000 Barrels)									1			1

## 6.4 Response Capabilities

Initial response actions are those taken by local personnel immediately upon becoming aware of a discharge or emergency incident, before the Company Spill Management Team (SMT) is formed and functioning. Timely implementation of these initial steps is of the utmost importance as they can greatly affect the overall response operation.

Local personnel who find themselves in a position to initiate initial response procedures should have had the appropriate training necessary in order to engage in these response actions. In the unlikely event that the appropriate training has not been received, then local personnel should contact their supervisor immediately to ensure properly trained individuals are dispatched.

A person evaluating a situation must assess the circumstances surrounding an event, to determine if an emergency situation exists, and respond accordingly. Company personnel are trained in hazards or emergency recognition procedures as described below.

An emergency in pipeline and facility operations often originates with the unexpected release of commodities. Uncontained commodities and high vapor concentrations present substantial hazards for fires or explosions until they dissipate to safe levels. In these situations, sources of ignition must be controlled to eliminate fire and explosion hazards. The Company has strict rules for controlling sources of ignition within the property to avoid such explosions or fires. Potential sources of ignition become more difficult to control on public property. Early detection and quick response are the best actions to reduce the hazards.

The first responder on-scene will:

- Take action to mitigate the situation and prevent escalation if safe to do so; and
- Immediately inform the Control Center (e.g. what is happening, where it is happening, personnel involved, what is being done about it)

The first responder will assume the role of the Incident Commander (IC).

Refer to the Company Emergency Classification and Tiered chart above for assistance in classifying and initiating response actions.

### 6.4.1 Emergency Notification Responsibilities

All Personnel	
The most important thing is individual personal safety!	
✓	Always think before responding.
✓	Never rush into the scene of an incident.
✓	Always assess the situation first and know the hazards.
✓	Never perform any actions that may put your safety at risk

### 6.4.2 ICS Activation

Determine the level of emergency and tier of response required to effectively manage the response.

ICS Is Scalable And Will Be Activated To Meet The Needs Of An Emergency	
Level 1	ICS is activated, Incident Management Team (IMT) staffed as required
Level 2	ICS is activated; IMT to manage re-active and pro-active phases. Command and general staff will be required with the potential to fill additional positions. Crisis Management will be notified based on significant incident criteria.
Level 3	Full IMT will be activated, CMT is notified.

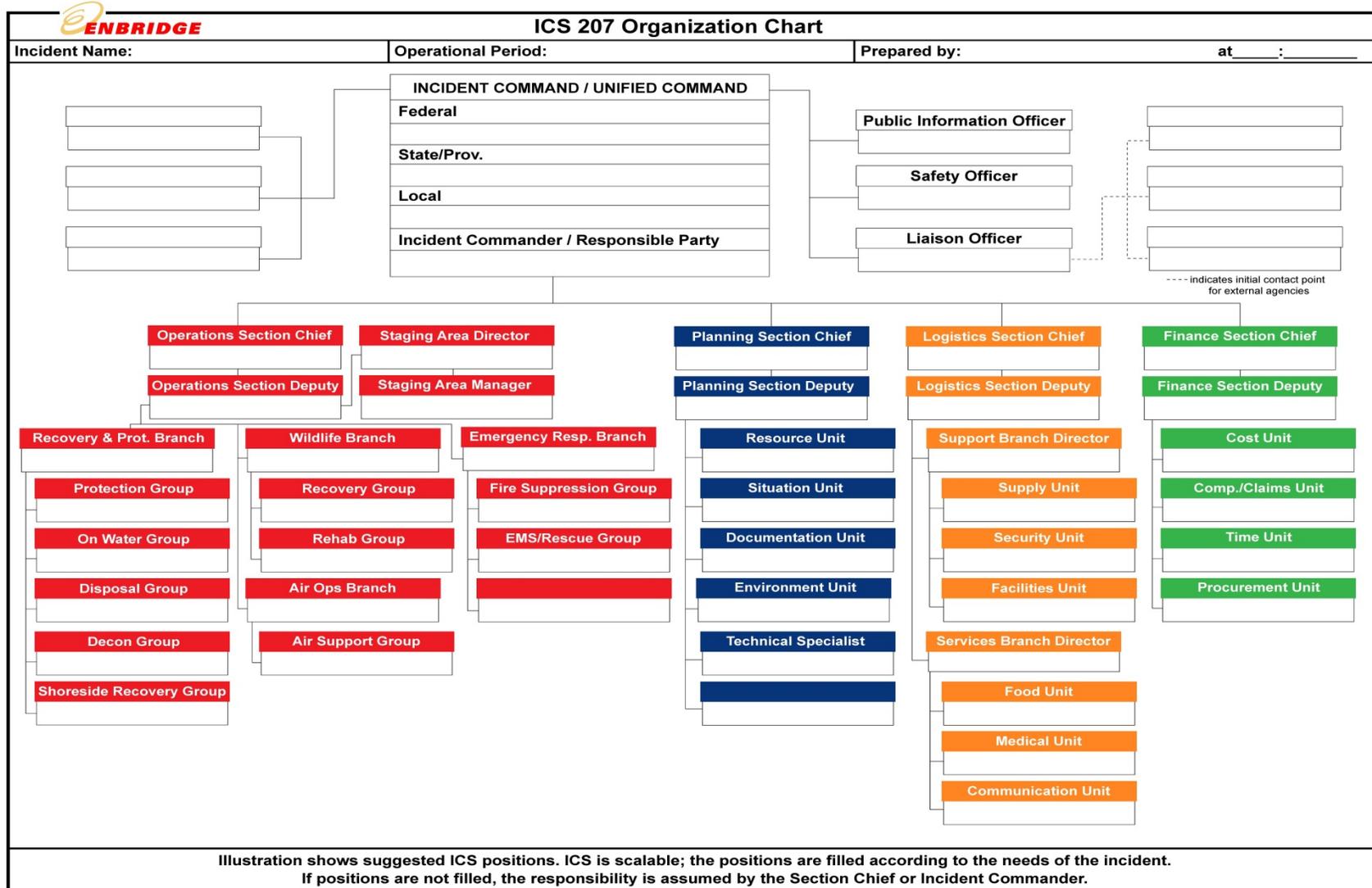
### 6.4.3 Common Responsibilities

Common Responsibilities Checklist	
Receive assignment from your IC/Designate, including:	
✓	Job assignment (e.g., Strike Team designation, position, etc.).
✓	Brief overview of type and magnitude of incident.
✓	Resource order number and request number.
✓	Reporting location & time.
✓	Travel instructions.
✓	Any special communications instructions (e.g., travel, radio frequency).
✓	Monitor incident related information from media, internet, etc., if available.
✓	Assess personal equipment readiness for specific incident and climate (e.g. medications, money, computer, medical record, etc.). Maintain a checklist of items and if possible a personal Go-Kit.
✓	Inform others as to where you are going and how to contact you.
✓	Review Incident Management Handbook (IMH).
✓	Take advantage of available travel to rest prior to arrival.

### 6.4.3 Common Responsibilities cont'd

Upon arrival at the incident, check-in at the designated check-in location. Check-in may be found at any of the following locations:	
✓	Incident Command Post, Base/Camps, Staging Areas, and Heli-bases.
✓	If you are instructed to report directly to a line assignment, check-in with the Division/Group Supervisor.
✓	Receive briefing from immediate supervisor.
✓	Agency Representatives from assisting or cooperating agencies report to the LNO at the Incident Command Post after check-in.
✓	Acquire work materials.
✓	Abide by organizational code of ethics.
✓	Participate in IMT meetings and briefings, as appropriate.
✓	Document information and key actions.
✓	Ensure compliance with all safety practices and procedures. Report unsafe conditions to the SOFR.
✓	Supervisors shall maintain accountability for their assigned personnel with regard as to exact location(s) and personal safety and welfare at all times, especially when working in or around incident operations.
✓	Organize and brief subordinates.
✓	The Command Staff and General Staff shall ensure branches are identified, set up and allocate divisions and groups within them to stay within the recommended span of control (1 Supervisor per 4-7 people).
✓	Know your assigned communication methods and procedures for your area of responsibility and ensure that communication equipment is operating properly.
✓	Use clear text and ICS/UC terminology (no codes) in all radio communications.
✓	Complete forms and reports required of the assigned position and ensure proper disposition of incident documentation as directed by the Documentation Unit Leader (DOCL).
✓	Ensure all equipment is operational prior to each work period.
✓	Report any signs/symptoms of extended incident stress, injury, fatigue or illness for yourself or coworkers to your supervisor.
✓	Respond to demobilization orders and brief subordinates regarding demobilization.
✓	Prepare personal belongings for demobilization.
✓	Return all assigned equipment to appropriate location.
✓	Complete Demobilization check-out process before returning to home base.
✓	Participate in After-Action activities as directed.
✓	Carry out all assignments as directed.

### 6.4.4 Company ICS Organization Chart



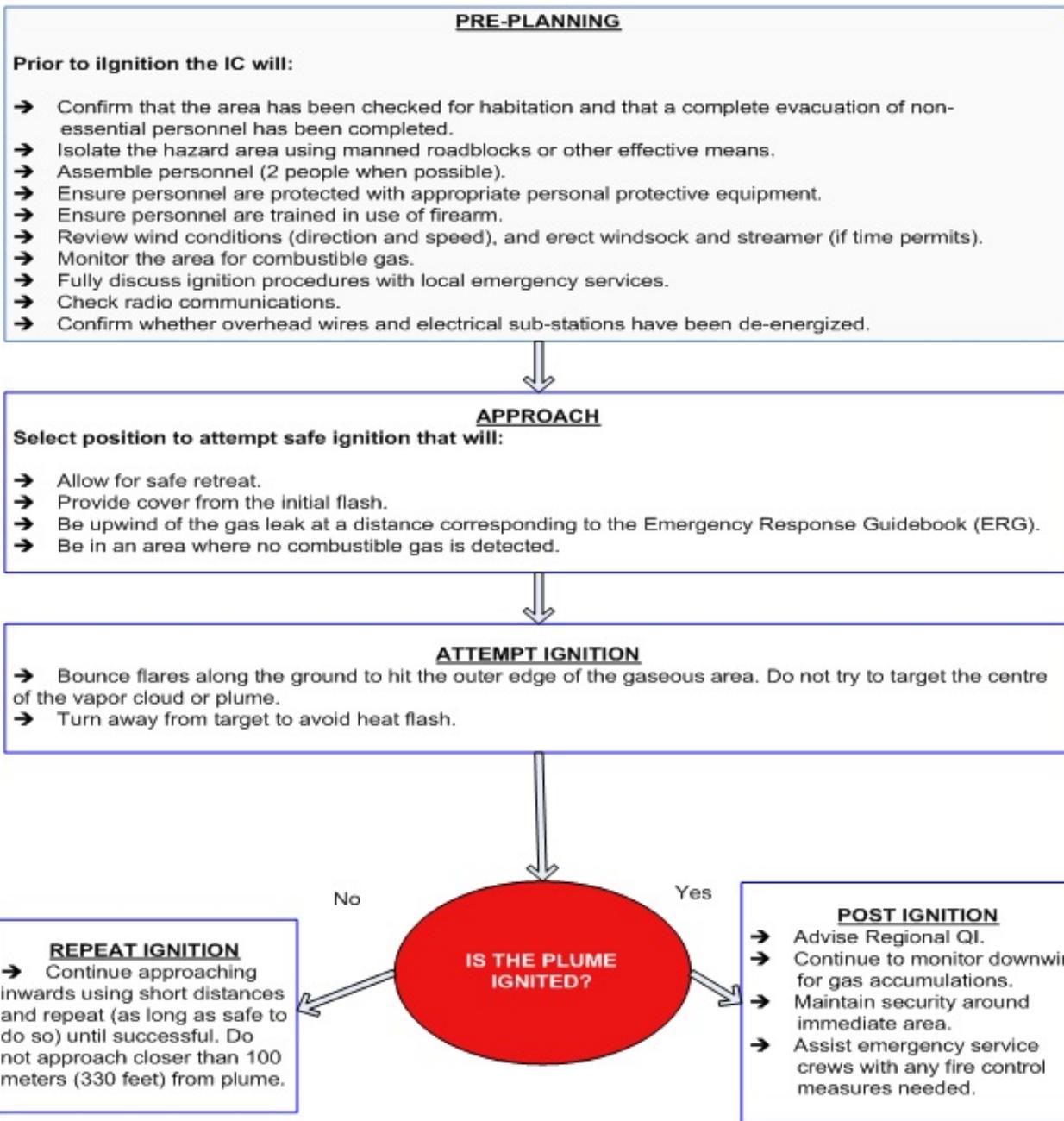
### 6.4.5 Ignition Decision Flowchart

**Consider the Impact of Ignition on People, the Environment and Property.**



### 6.4.6 Ignition Procedure Flowchart

On-scene personnel will coordinate and lead the safe ignition of gas release



### 6.4.7 Oil Spill Surveillance

Spill Surveillance Guidelines	
✓	Spill surveillance should begin as soon as possible to aid response personnel with assessing spill size, movement and potential impact locations.
✓	Cloud shadows, sediment, floating organic matter, submerged sand banks, or wind-induced patterns on the water may resemble an oil slick if viewed from a distance.
✓	Use surface vessels to confirm the presence of any suspected oil slicks on water, if safe to do so. If possible, direct the vessels from the aircraft and photograph the vessels from the air to show their position and size relative to the slick.
✓	It is difficult to adequately observe oil on the water from a boat, dock or shoreline.
✓	Spill surveillance is best accomplished using helicopters or small planes. Helicopters are preferred due to their superior visibility and maneuverability characteristics.
✓	If fixed-wing planes are used, high wing types provide better visibility than low-wing types.
✓	Document all observations in writing and with photographs and/or videotapes.
✓	Describe the approximate oil slick dimensions based on available reference points (i.e. vessel, shoreline features, facilities). Use aircraft or vessel (if safe to do so) to traverse the length and width of the slick while timing each pass. Calculate the approximate size and area of the slick by multiplying speed and time.
✓	Record aerial observations on detailed maps.
✓	In the event of reduced visibility, such as dense fog or cloud cover, boats may be used for patrols and documenting the location and movements of the spill. Boats will only be used if safe conditions are present, including on-scene weather and product characteristics.
✓	Surveillance is also required during spill response operations in order to gauge effectiveness of response operations, to assist in locating skimmers and to continually assess size, movement and impact of spill.

Spill Volume Estimating	
Early in a spill response, estimation of spill volume is required in order to:	
✓	Report to agencies.
✓	Determine liquid recovery requirements.
✓	Assess manpower and equipment requirements.
✓	Determine disposal and interim storage requirements.

### 6.4.7 Oil Spill Surveillance cont'd

In the event that actual spill volumes are not available, it may be necessary to estimate this volume. See Figure 6.4.8 Volume Estimate Flowchart.

Spill Volume Estimation Methods	
✓	<p><b>Water:</b> Visual observation and calibration with the A.P.I. Task Force on Oil Spill Cleanup, Committee for Air and Water Conservation's Spill Size Estimation Matrix. Methods which can be used to determine size and volume of a spill include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• Vessel/line capacity formulas</li> <li>• Infra-red thermal imaging</li> </ul>
✓	<p><b>Land:</b></p> <ul style="list-style-type: none"> <li>✓ Use the Transportation Spill to Land Estimation Tool</li> <li>✓ SCADA (Control Center calculation)</li> <li>✓ Tank Data Program</li> </ul>

#### Initial Estimates

If available, information provided from the control center can be used to provide an initial estimate of the spill volume. The volume released should match the change in a cutoff inventory measurement.

#### Tanks

If the leak source can be isolated to a tank, an initial leak volume estimate can be determined as:

Volume = the change in height of the tank x the volume per inch as found on the tank strapping table

#### Mainline Releases

An initial release volume can be calculated as:

Volume = (the mainline flow rate x the time to isolate) + the volume of drain-up from the release site to the next high point in the line

The volume release estimate can be verified by the mismatch in injection and delivery flow meters or tank volume change. In systems where ATMOS pipe is used for leak detection (i.e. gathering system), the estimated leak size is available in the user screen.

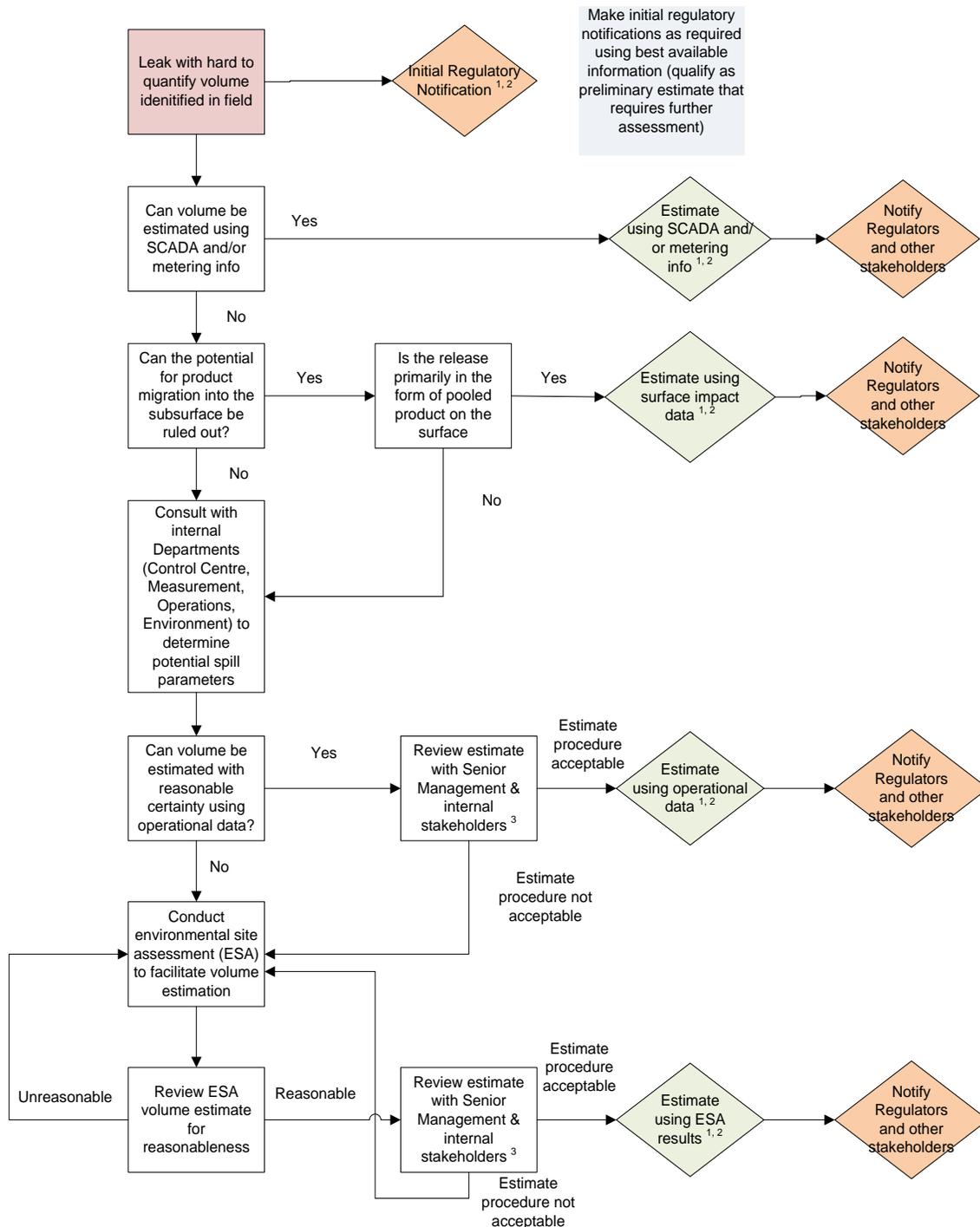
#### Leak on Land – Field Measurement

To estimate the volume of a spill in a field location, the spill is segmented to a summation of area calculations. The volume of each area is calculated as the length x the width x the depth.

Conversions:

- 1 m<sup>3</sup> = 6.29 bbls
- 1 in = 0.0254 meters
- 1 ft<sup>3</sup> = 0.178 bbls
- 1 inch = 0.0833 ft.

### 6.4.8 Volume Estimate Flowchart



**Notes:**

1. Estimates must take uncertainties (such as extent of subsurface contamination, duration of leak, etc) into account.
2. In situations where there are significant uncertainties, it is preferable to estimate using a range (low case, likely case, and high case).
3. Internal stakeholders typically include Operations, Public & Government Affairs, Environment and Law.

Immediate actions will be taken at the onset or discovery of an incident to mitigate the effects and carry out an effective response. Under no circumstances will personnel place themselves in harm's way or be directed to do so by others when performing response activities.

Such actions include, but are not limited to:

- For a natural gas release, contact local law enforcement for possible reverse 911 public notifications or activation of public alarm systems (i.e. Emergency Broadcast System, Public Awareness Announcements, etc.) ensuring the health and safety of the public; evacuation to safe areas as necessary and restricting access to the area;
- Securing the site using best methods available;
- If necessary, contacting local emergency response agencies (police, fire and EMS) for assistance;
- Taking measures to reduce or control the impact of the emergency (e.g., block culverts/sewers, dam ditches, shut down ignition sources) maintaining the safety of personnel involved in these activities;
- Coordinating with response personnel arriving at the site; and
- Documenting key events using best methods available.

<b>Initial Response Checklist</b>	
<b>The order of these actions will depend on the situation.</b>	
<b>EXPLORE-</b> To be reviewed by the Enbridge Responder prior to taking any immediate action.	
✓	Determine the wind direction and approach cautiously from upwind.
✓	Explore the suspected release area only when using/wearing PPE appropriate to the hazard (under the buddy system if possible).
✓	Ensure safety of personnel in the area.
✓	Conduct a hazard assessment to determine the potential for fire, explosion and hazardous toxic vapors.
✓	Eliminate or shut off all potential ignition sources in the immediate area.
✓	Use intrinsically safe equipment (e.g., flashlights, two-way radios, gas detectors with audible alarms).
✓	Maintain regular/scheduled communication with the Control Center and QI/on-call person.

Approach	
✓	Verify wind direction and stay upwind.
✓	Determine if people are injured or trapped.
✓	Determine if there are third party people involved in rescue or evacuation.
✓	Determine if there are immediate signs of potential hazards such as:
✓	<ul style="list-style-type: none"> <li>• Electrical lines down or overhead</li> </ul>
✓	<ul style="list-style-type: none"> <li>• Unidentified liquid or solid products visible</li> </ul>
✓	<ul style="list-style-type: none"> <li>• Hazardous vapors</li> </ul>
✓	<ul style="list-style-type: none"> <li>• Smells or respiratory hazards evident</li> </ul>
✓	<ul style="list-style-type: none"> <li>• Fires, sparks or ignition sources</li> </ul>
✓	<ul style="list-style-type: none"> <li>• Holes, caverns, deep ditches, fast water or cliffs in area</li> </ul>
✓	Determine if local traffic is or may become a problem.
✓	Determine ground conditions (Examples: dry, wet, icy, etc.).

Communication	
✓	Initiate actions to notify government agencies including local authorities of area affected or at risk areas via the Control Center, QI or designate.
✓	Complete notifications for emergency call-out, including regulatory agencies. This will be done by the QI/or designate.
✓	If excavating, confirm that One-Call agency has been notified.
✓	Determine if a Preliminary Incident Report has been issued.
✓	Determine if a radio channel has been established for communication between the site and other personnel in field.

Considerations	
✓	If the emergency calls for it, request surveillance fly-over to determine: <ul style="list-style-type: none"> <li>• Size and description of oil slick</li> <li>• Direction of movement</li> <li>• Coordinates of leading and trailing edge of oil slick</li> <li>• Sensitivities endangered</li> <li>• Areas of population that are threatened</li> </ul>
✓	If possible, photograph the area for situational awareness taking into account ignition source hazards.
✓	Once support has arrived, conduct transfer of command and start preparing for tactical and planning meetings.

All documents and logs drafted during an initial response will be submitted to the Documentation Unit for permanent retention.

The following pages contain Emergency Response Guides for First Responders. The response action guides contain response actions for:

- Pipeline Release
- Tank Failure
- Tank Overfill
- Natural and Other Gas Leaks
- Fire or Explosion
- Equipment Failure
- Failure of Transfer Equipment
- Evacuation
- Wildfire
- Storm or Flood
- Earthquake

# Emergency Response Guide First Responder

# Pipeline Release

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone
- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post
- Ensure Safety Officer begins and completes a Site Safety Plan

2

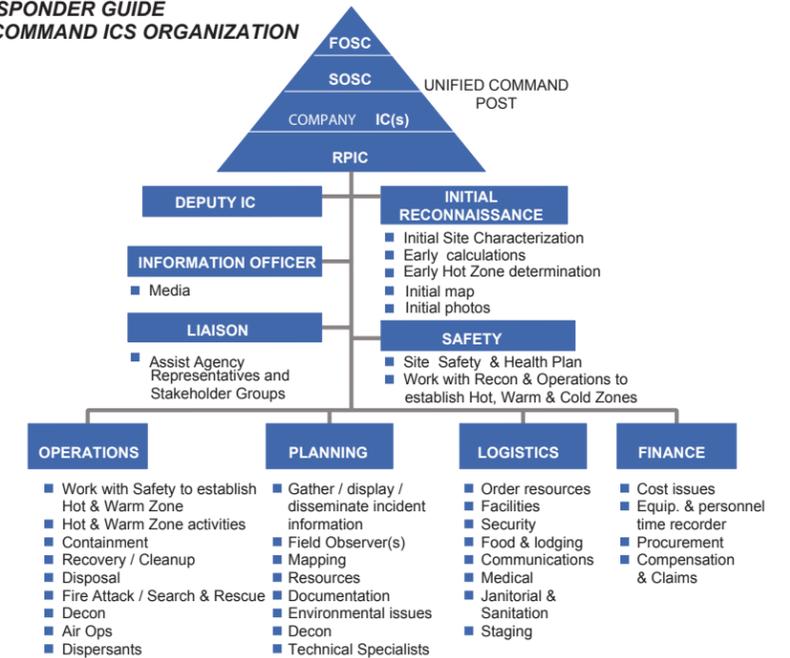
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
- OSRO's work under the Operations Section and should not freelance

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
- Protective action tactical deployment should be part of the Unified IAP

3

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

4

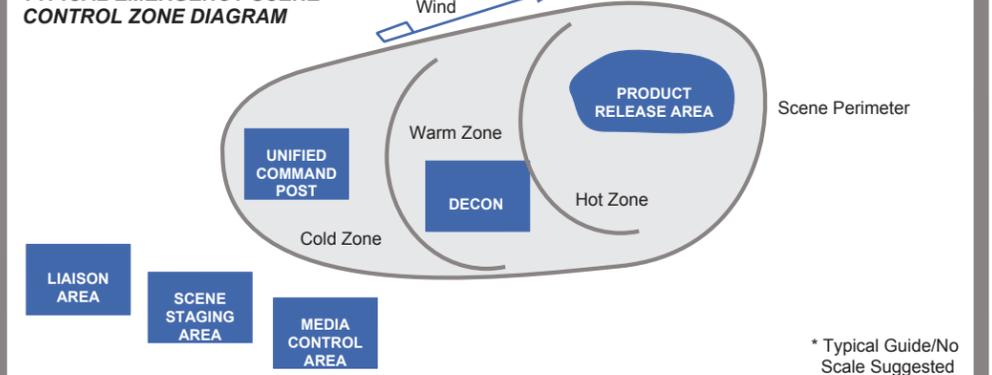
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Shut-off flow
- Isolate leaking section of piping
- Notify Terminal Supervisor, Manager or designee
- Place a container under the leak and attempt to temporarily plug the hole
- Initiate spill containment (if outside containment area)
- Evacuate contents of line with suction pump or flush with water to remove remaining oil
- Block and purge affected equipment
- Initiate recovery/clean-up actions

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Incident Report Form & Notifications
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline, Diesel & Crude Oil	128
Oil < 200°F	171
LPG	119
Natural Gas	115



# Emergency Response Guide First Responder

# Tank Failure

## SAFETY

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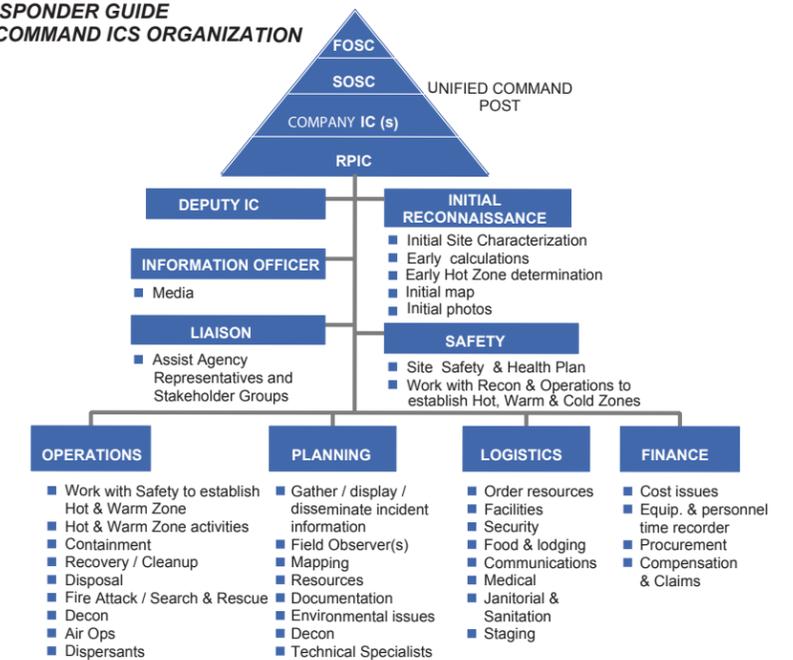
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## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



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- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
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## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
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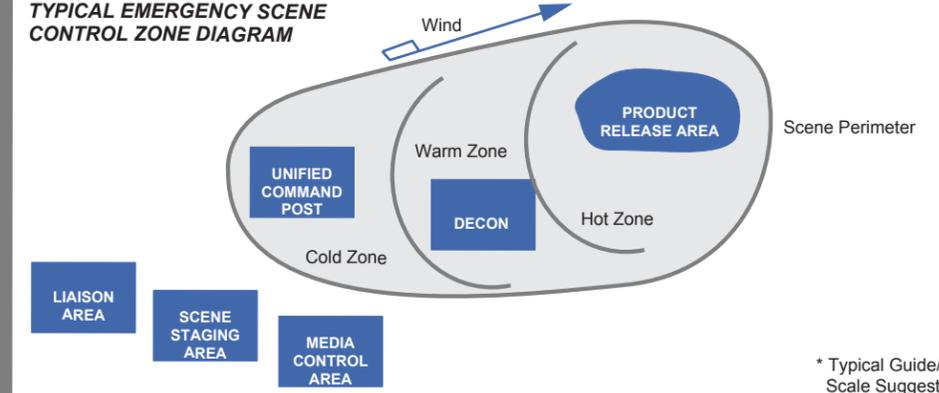
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## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- If safe, ensure dike drains are closed
- Notify Terminal Supervisor, Manager or designee
- Secure area
- Initiate response actions

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Incident Report Form & Notifications
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline, Diesel & Crude Oil	128
Oil < 200°F	171
LPG	119
Natural Gas	115



# Emergency Response Guide First Responder

# Tank Overfill

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone
- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post

2

- Ensure Safety Officer begins and completes a Site Safety Plan

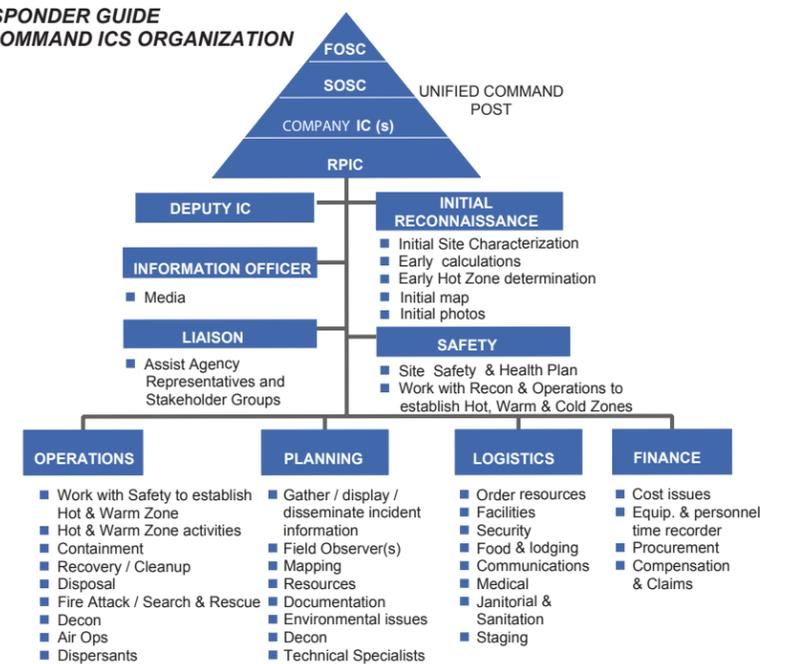
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

3

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
- OSRO's work under the Operations Section and should not freelance

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
- Protective action tactical deployment should be part of the Unified IAP

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

4

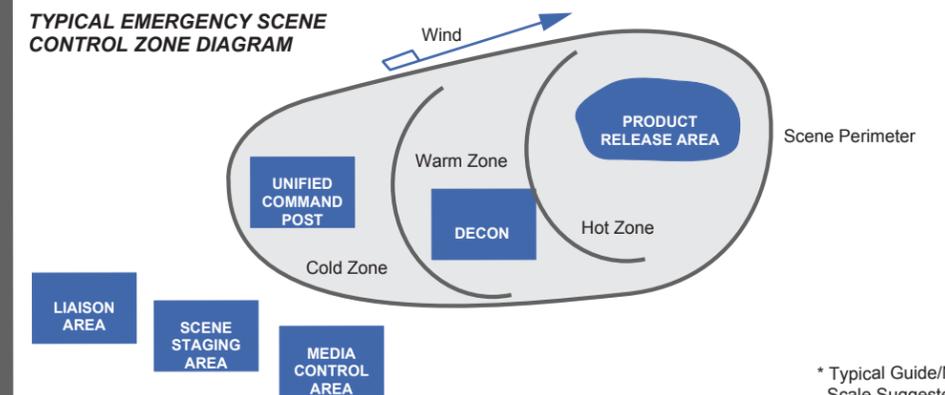
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Shut off flow to tank
- If safe, ensure dike drains are closed
- Begin transfer of contents to other tankage
- Notify Terminal Supervisor or Manager
- Secure area
- Initiate response actions

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Incident Report Form & Notifications
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline, Diesel & Crude Oil	128
Oil < 200°F	171
LPG	119
Natural Gas	115



# Emergency Response Guide First Responder

# Natural and Other Gas Leaks

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help evaluate and deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire department assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

1

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone
- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post
- Ensure Safety Officer begins and completes a Site Safety Plan

## IDENTIFICATION AND ASSESSMENT

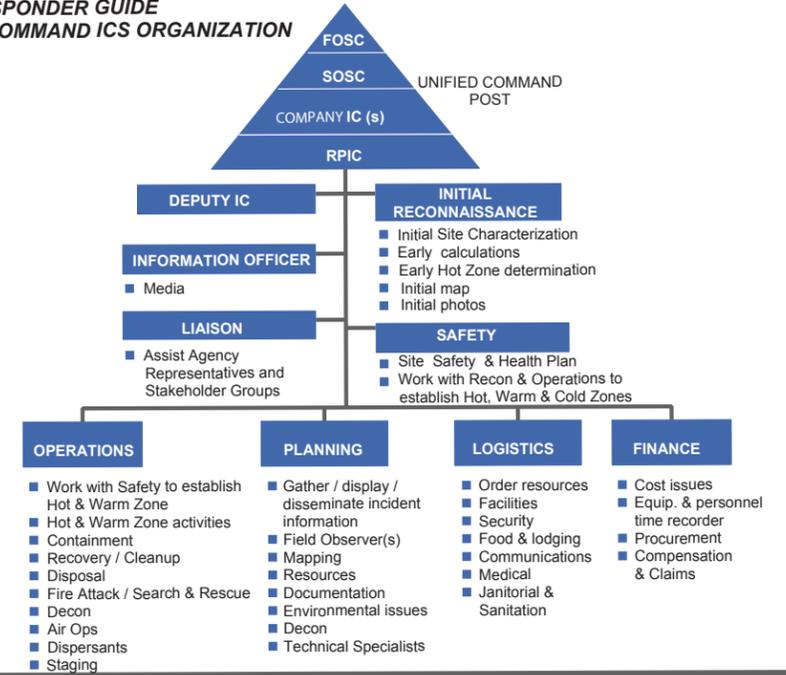
- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Create an Initial Action Plan (ICS Form 201)

2

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety Health Plan (SSHP)

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
- OSROs work under the Operations Section and should not freelance

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
- Protective action tactical deployment should be part of the Unified IAP

3

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team

## DISPOSAL

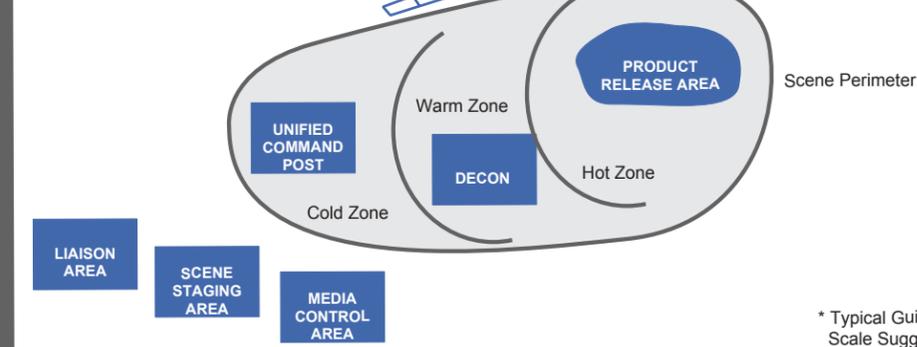
- Minimal disposal issues

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident-related documents
- Ensure timely incident critique & record lessons learned

4

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Shut down and isolate flow
- Evacuate the area
- Eliminate sources of ignition
- All equipment used when handling product must be grounded
- Water spray may reduce vapors or divert vapor cloud
- If exposed, make sure exposed clothing is removed and decon occurs

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Notification Fax
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 202
- Site Safety and Health Plan (SSHP)
- ICS Form 215

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline	128
Diesel	128
LPG	119
Natural Gas	115
Crude Oil	128



# Emergency Response Guide First Responder

# Fire or Explosion

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone
- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post
- Ensure Safety Officer begins and completes a Site Safety Plan

2

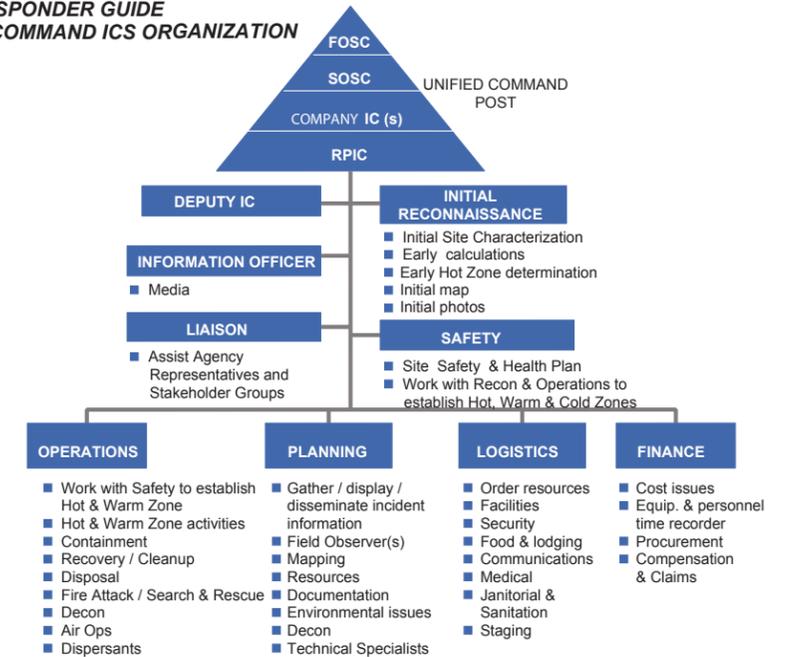
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

3

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees strategies

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on area
- Protective action tactical deployment should be part of the Unified IAP

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

4

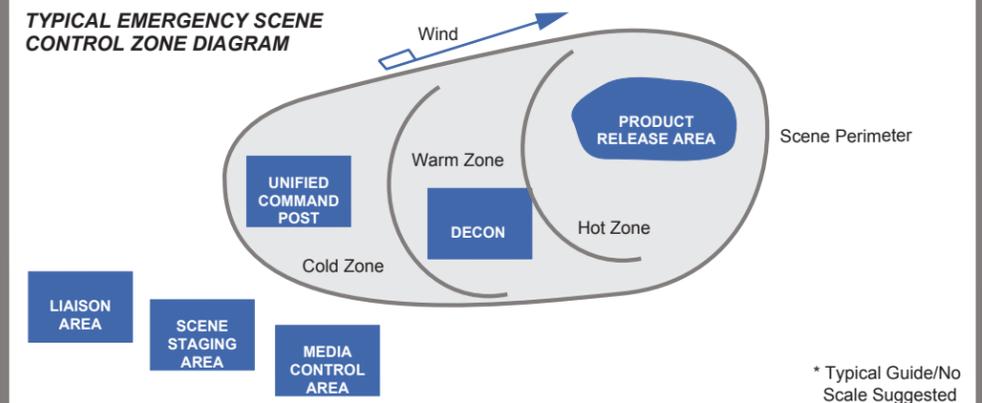
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Alert personnel
- Notify Supervisor, Manager or designee
- Activate alarm as required
- Notify local fire department
- Evacuate non-essential individuals
- Identify cause/source/materials involved
- Contain fire/spill/material released
- Consider potential for escalation
- Protect exposures

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Incident Report Form & Notifications
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline, Diesel & Crude Oil	128
Oil < 200°F	171
LPG	119
Natural Gas	115



# Emergency Response Guide First Responder

# Equipment Failure

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone
- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post
- Ensure Safety Officer begins and completes a Site Safety Plan

2

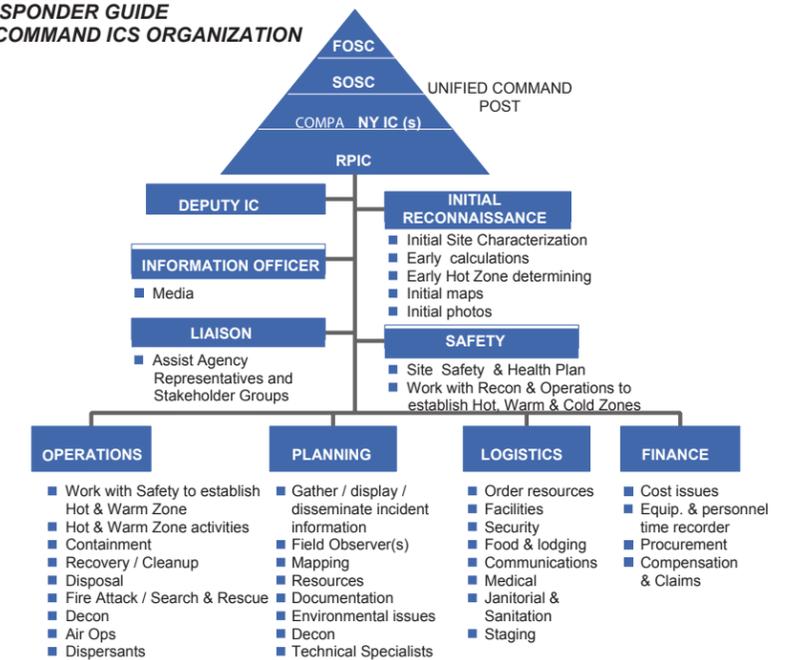
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
- OSRO's work under the Operations Section and should not freelance

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
- Protective action tactical deployment should be part of the Unified IAP

3

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

## DISPOSAL

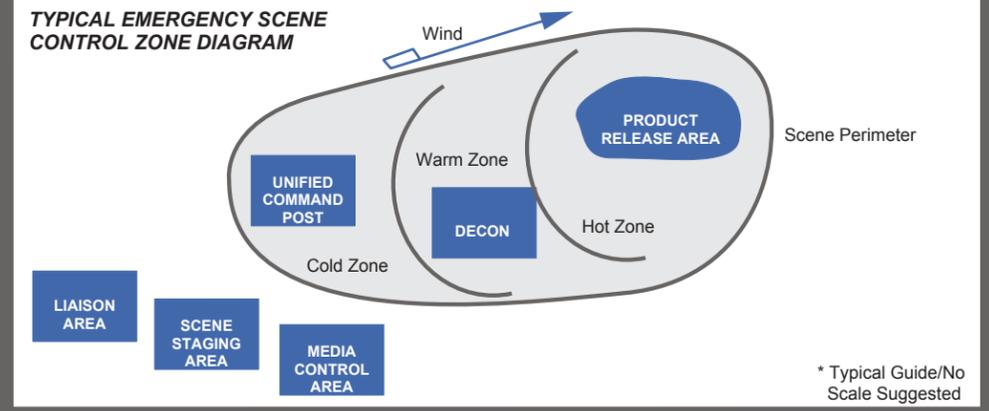
- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

4

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- P** People
- E** Environment
- A** Assets
- R** Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Shut-off flow
- Notify Terminal Supervisor, Manager or designee
- Tighten leaky valve or fitting, if safe
- Transfer tank contents to available tankage

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Notification Fax
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline	128
Diesel	128
Crude Oil	128
Oil < 200°F	171



# Emergency Response Guide First Responder

# Failure of Transfer Equip

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone

2

- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone

- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post

- Ensure Safety Officer begins and completes a Site Safety Plan

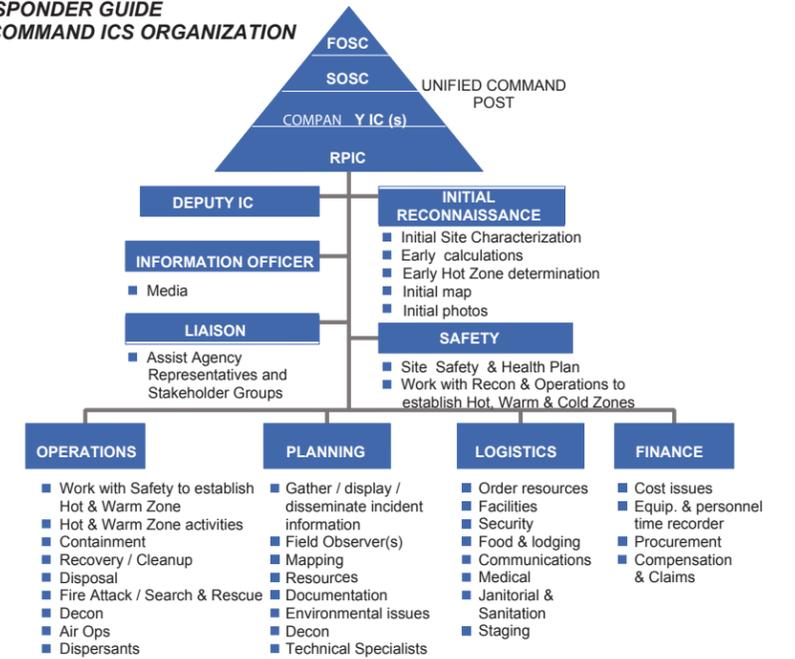
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

3

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
- OSRO's work under the Operations Section and should not freelance

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
- Protective action tactical deployment should be part of the Unified IAP

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

4

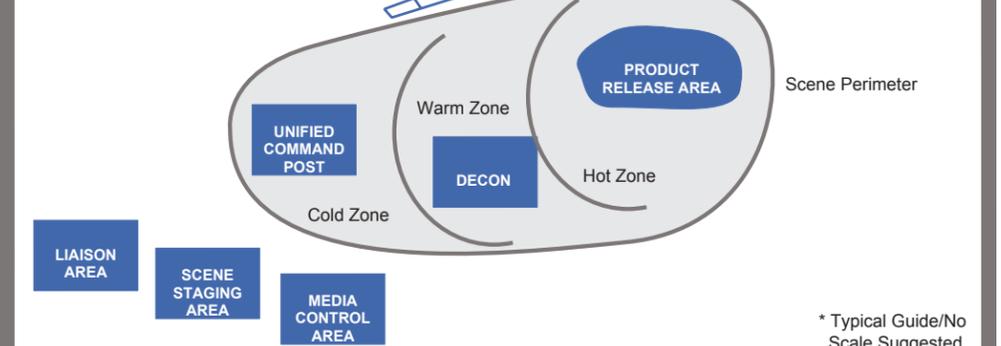
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



\* Typical Guide/No Scale Suggested

## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Shut off transfer pumps. Close header & tank valves
- Notify Terminal Operators/Manager/Vessel
- Drain remaining contents of like to vessel tanks
- Secure area
- Initiate response actions

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Notification Fax
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline	128
Diesel	128
Crude Oil	128
Oil < 200°F	171



# Emergency Response Guide First Responder

# Evacuation

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help evaluate and deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire department assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

1

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
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- Begin assigning ICS positions as necessary
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- Ensure Safety Officer begins and completes a Site Safety Plan

## IDENTIFICATION AND ASSESSMENT

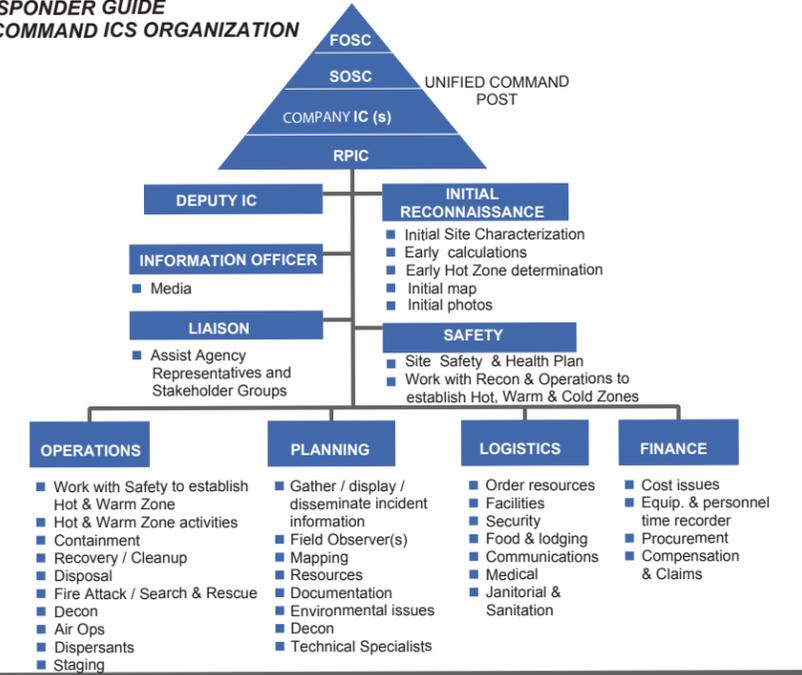
- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Create an Initial Action Plan (ICS Form 201)

2

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety Health Plan (SSHP)

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees containment & control tactical deployment
- OSROs work under the Operations Section and should not freelance

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on water intakes, adjoining properties, public recreation sites & sensitive sites
- Protective action tactical deployment should be part of the Unified IAP

3

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team

## DISPOSAL

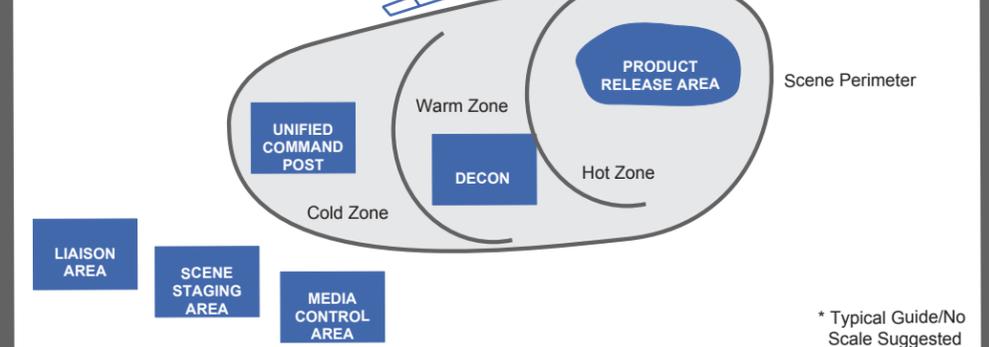
- Minimal disposal issues

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident-related documents
- Ensure timely incident critique & record lessons learned

4

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



\* Typical Guide/No Scale Suggested

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Notification Fax
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 202
- Site Safety and Health Plan (SSHP)
- ICS Form 215

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline	128
Diesel	128
LPG	119
Natural Gas	115
Crude Oil	128

## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Shut down and isolate flow
- Evacuate the area
- Eliminate sources of ignition
- All equipment used when handling product must be grounded
- Water spray may reduce vapors or divert vapor cloud
- If exposed, make sure exposed clothing is removed and decon occurs



# Emergency Response Guide First Responder

# Wildfire

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
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- Ensure Safety Officer begins and completes a Site Safety Plan

2

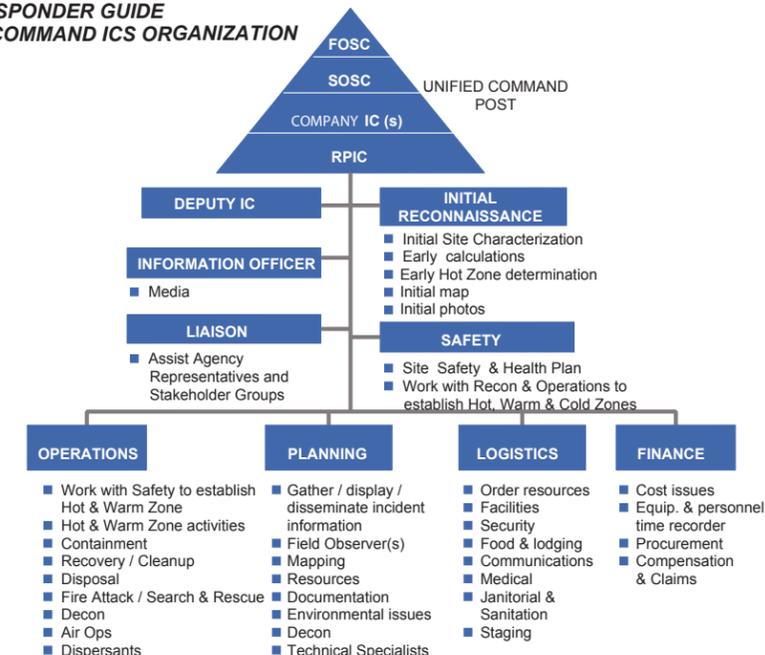
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

3

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees strategies

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on area
- Protective action tactical deployment should be part of the Unified IAP

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

4

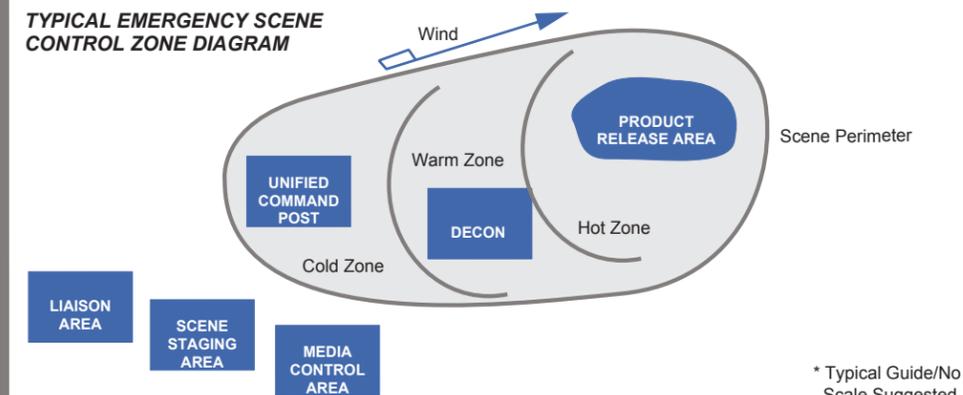
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

We will prudently over respond to any incident with priorities in the following order:

- People
- Environment
- Assets
- Reputation

## FACILITY MITIGATION/PROTECTION ACTIONS

- Alert personnel
- Notify Supervisor, Manager or designee
- Activate alarm as required
- Notify local fire department
- Evacuate non-essential individuals
- Identify cause/source/materials involved
- Contain fire/spill/material released
- Consider potential for escalation
- Protect exposures

## INITIAL ICS/NOTIFICATION FORMS THAT MAY BE UTILIZED

- Incident Report Form & Notifications
- ICS Form 201 (Incident Briefing, 1-5)
- ICS Form 214 (Unit Log)
- Site Safety and Health Plan (SSHP)
- ICS Form 232 (Resources at Risk Summary)

## DOT EMERGENCY RESPONSE GUIDEBOOK QUICK REFERENCE PAGES

Product	Guide #
Gasoline, Diesel & Crude Oil	128
Oil < 200°FP	171
LPG	119
Natural Gas	115



# Emergency Response Guide First Responder

# Storm or Flood

## SAFETY

- Your safety first and then the safety of others
- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

## ISOLATE AND DENY ENTRY

- Evacuate the immediate area
- Deny entry to the immediate area
- Ask others to help deny entry into the area
- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

- Contact your Supervisor
- Contact Control Center
- Dial 911 if ambulance, police or fire dept. assistance is needed
- Contact local OSRO (Notifications Section of this Plan)
- Follow Notifications Procedures (Notifications Section of this Plan)

## COMMAND MANAGEMENT

- Assume the role of Incident Commander
- Make an announcement to all on the scene that you have assumed Command
- Establish a Unified Command Post up wind, up hill and up stream of the incident in the cold zone
- Establish a Unified Staging Area up wind, up hill and up stream of the incident in the cold zone
- Begin assigning ICS positions as necessary
- Meet, greet & brief responding Agencies as they arrive at the Unified Command Post
- Ensure Safety Officer begins and completes a Site Safety Plan

2

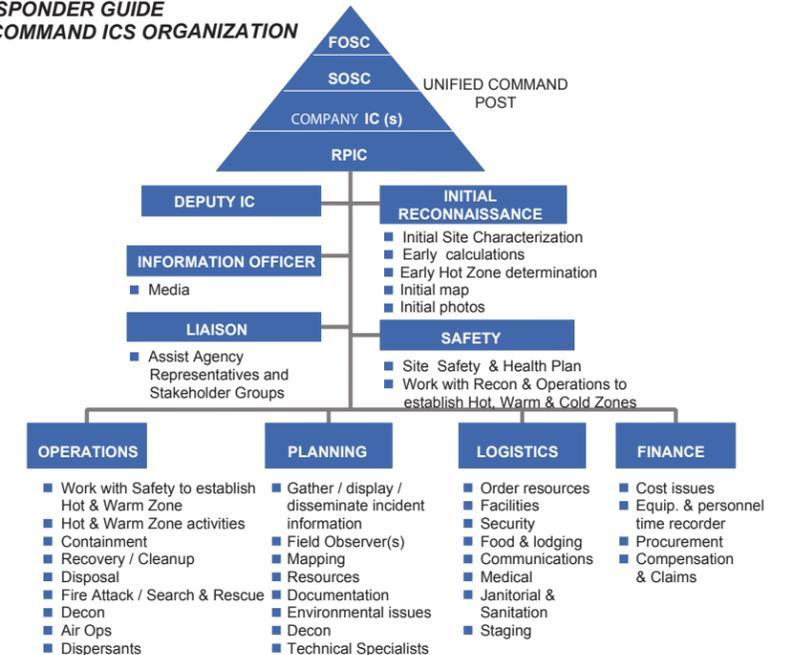
## IDENTIFICATION AND ASSESSMENT

- Continue to evaluate the hot zone and adjust accordingly
- Continue to monitor evacuation activities
- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

- Complete an ICS Form 201 and Incident Action Plan

## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

- Ensure proper levels of PPE
- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

3

## CONTAINMENT & CONTROL

- Containment & control strategies should be developed within the Unified IAP process/follow ACP
- Operations Section Chief oversees strategies

## PROTECTIVE ACTIONS

- Ensure safe Recon to assess impact on area
- Protective action tactical deployment should be part of the Unified IAP

## DECONTAMINATION / CLEANUP

- Decon activities take place under the ICS Ops Section
- Decon capabilities in place before entering Hot Zone
- Ensure proper PPE for Decon Team
- Clean up strategies should be part of the Unified IAP
- Decon runoff needs to be contained and properly disposed of

4

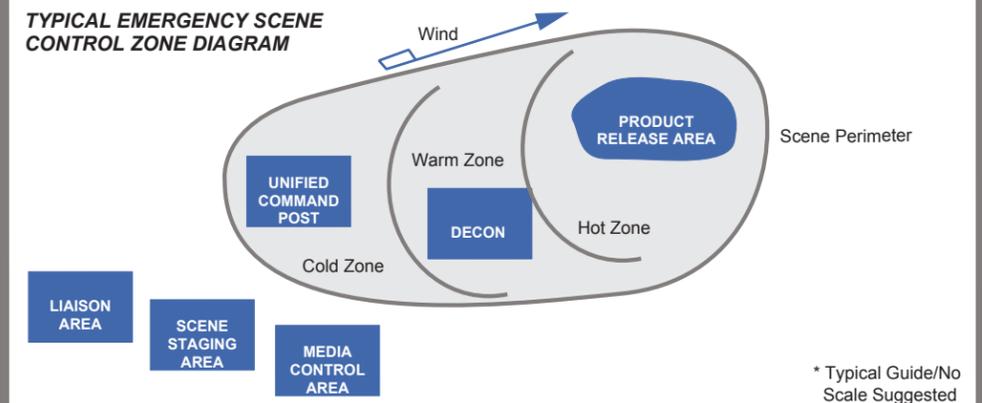
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
- Ensure proper retention of all incident related documents
- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



\* Typical Guide/No Scale Suggested

## OBJECTIVES

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# Emergency Response Guide First Responder

# Earthquake

## SAFETY

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- Stay out of the hazard area
- If performing Recon approach up wind, up hill, up stream
- Determine the immediate hot zone

1

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- Deny entry to the immediate area
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- If on the scene, ask agency resources to help deny entry into immediate area

## NOTIFICATIONS

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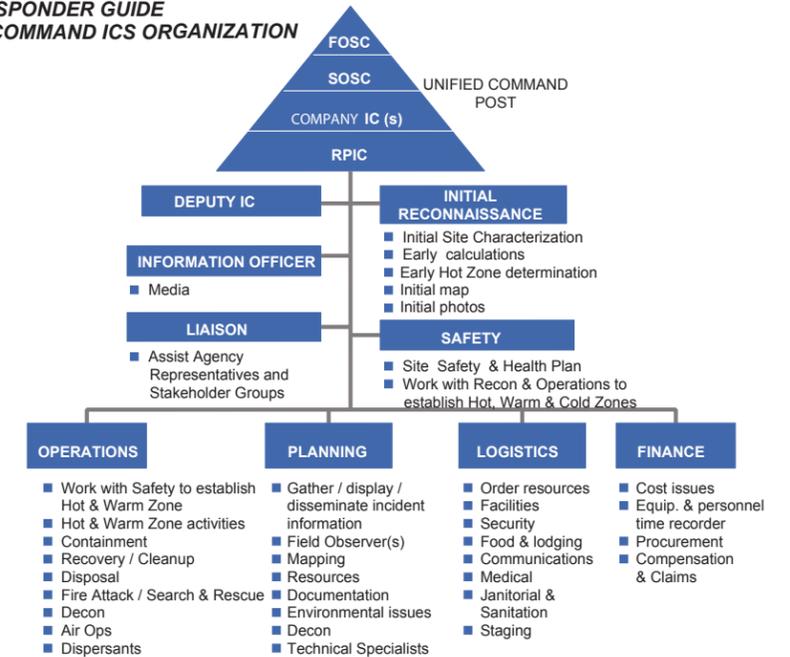
## IDENTIFICATION AND ASSESSMENT

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- Ensure safe Recon to determine extent of impact on water, air, soil, plant life & wildlife

## ACTION PLANNING

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## FIRST RESPONDER GUIDE UNIFIED COMMAND ICS ORGANIZATION



## PROTECTIVE EQUIPMENT

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- Ensure PPE is in line with Site Safety and Health Plan (SSHP)

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- Containment & control strategies should be developed within the Unified IAP process/follow ACP
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- Decon activities take place under the ICS Ops Section
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- Clean up strategies should be part of the Unified IAP
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4

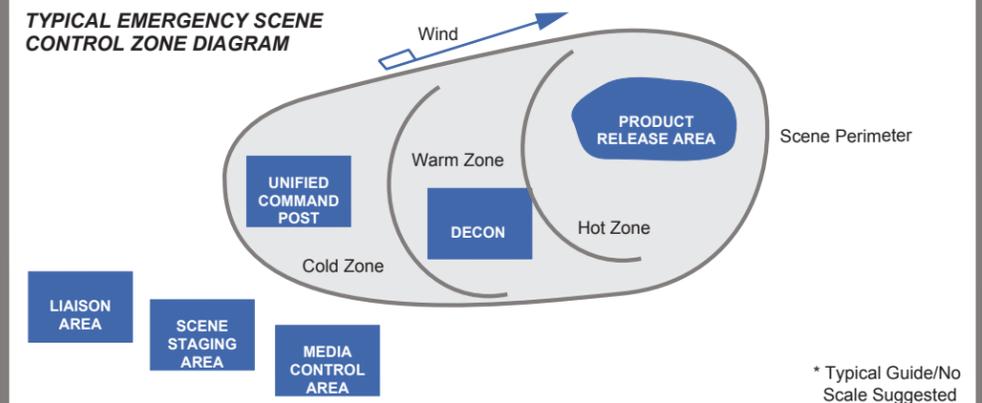
## DISPOSAL

- Ensure early notification of EH&S
- Consult Waste Management Section of this Plan

## DOCUMENTATION

- Ensure early completion of ICS Form 201 & SSHP
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- Ensure timely incident critique & record lessons learned

## TYPICAL EMERGENCY SCENE CONTROL ZONE DIAGRAM



## OBJECTIVES

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Natural Gas	115



## 6.5 Evacuation

It's important to remember that a need to evacuate will have to be initiated by governmental entities. Both the National Response Framework along with Area Contingency Plans address evacuation of populations due to an emergency. The company will serve only in an advisory capacity during any evacuation order.

State, tribal, and local governments have primary responsibility and authority for evacuation planning and for the transportation, sheltering, public safety, and security of persons and non-Federal property within their respective jurisdictions. The unique challenges that might confront State, tribal, and local governments during a mass evacuation could require them to request additional assistance, of either a logistical or operational nature, from within their state, from other states pursuant to mutual aid and assistance compacts, or from the Federal Government.

State and local law enforcement agencies have primary responsibility to provide for public safety and security during an incident that requires a mass evacuation. During a mass evacuation, State, tribal, and local law enforcement agencies will be conducting operations in accordance with their respective plans and protocols.

It will be incumbent upon the Company to provide as much product information as possible to any government evacuation order. Therefore the latest version of the Emergency Response Guidebook (ERG)\* should be consulted in order to determine safe evacuation distances. This Guidebook is used by first responders during the initial phase of a dangerous goods/hazardous materials transportation incident. It is a joint publication by the U.S. DOT (PHMSA), Transport Canada and The Secretariat of Transport and Communications of the Mexican Government.

All evacuation directives will be communicated through an audible signal, either through voice by the Designated Supervisor of PLM or Terminal, the Designated Emergency Warden and/or Area Supervisor, or by the activation of an alarm system. All facility personnel are trained routinely in evacuation and emergency response procedures. The facility contains no critical equipment that requires employees to continue to operate after the evacuation notification is made.

The purpose of the evacuation plan is to provide some guidance in the event shutdown and evacuation are necessary. In the event of an incident, the facility operator will stop the flow of product by normal operating procedures. The facility supervisor shall be notified immediately of the emergency. Any facility personnel who are not trained as Hazardous Material Technicians will evacuate the facility. The Fire Department will be notified if there is a fire. Arriving personnel, equipment and fire resources will be met at the main gate of the Facility, unless deemed unsafe to do so. Tactical deployment of arriving resources will depend on the current situation.

Evacuating personnel shall proceed in an orderly manner. The Supervisor will account for all employees and arrange for medical assistance as required.

**\*This is the guidebook used in HAZWOPER Training**

When the alarm is sounded or a signal to evacuate is given all personnel should:

Evacuation Checklist	
✓	Immediately stop work activities.
✓	Check the wind direction.
✓	Move upwind or cross wind.
✓	Check the wind again.
✓	Conduct a head count to account for all personnel known to be at the facility.
✓	Assist in alerting and escorting personnel, including visitors and contractors to the appropriate evacuation point.
✓	Notify the Control Center.
✓	Assist in hazard control activities as requested.
✓	Injured personnel will be transported to the nearest emergency medical facility. Assist in search and rescue of missing persons.
✓	All other personnel will remain at the evacuation point until the "All Clear" signal is given.

**Note: Evacuation should be carried out in an orderly manner. Personnel should WALK, not run or panic.**

## 6.6 Mitigation efforts

The primary consideration in mitigation efforts is public safety, environmental pollution and property. This section provides guidelines for controlling a release near the source and mitigating the associated consequences. Source control and mitigation involve anything from shutdown of operations to containing a spill, dispersing a vapor cloud, protecting a sensitive area, recovering the spilled material, or other such activities that are involved in an emergency response. Initial emergency response efforts should stay focused at mitigating and stopping the release in the most expeditious and safe manner as possible. The following tables are to assist initial responders and serve as a guide for actions to be considered.

**In the event of a spill involving a pipeline leak or rupture, the initial mitigation actions will likely consist of:**

✓	Shutting down the pipeline.
✓	Relieving the pressure on the affected line section.
✓	Isolating the line section by closing the appropriate valves.
✓	Evacuating the remaining contents of the affected line section.

**If the incident were to involve a breakout tank leak or overfill, the initial mitigation actions may include:**

✓	Terminating transfer operations to the tank, if in progress.
✓	Ensuring associated secondary containment system drain valves are closed.
✓	Transferring the tank contents into available tankage or back into the pipeline.
✓	Water flooding the containment area, if applicable, to minimize soil penetration.

**Source control measures are implemented as close as possible to the source of a spill to minimize the extent of the affected area and generally involve:**

✓	Construction of barriers, trenches, or earthen berms for containment.
✓	Construction of berms or trenches for diverting spill to containment area.
✓	Deployment of containment booms in waterways down current of the source.
✓	Deployment of recovery equipment (pumps, vacuum trucks, skimmers).

The following tables should be utilized by initial responders as guidance for their initial efforts. The guidance provided does not meet every scenario and good judgment and experience should factor in as well.

<b>Pipeline Leak or Rupture Checklist</b>	
Procedures	
✓	Assess situation and exercise caution.
✓	Eliminate all ignition sources onsite.
✓	Shut down pumps, close block valves, and shut down affected line.
✓	If person(s) down, refer to Medical Emergency Checklist.
✓	Contain spill (if safe to do so).
✓	Assign person to direct emergency response vehicles.
✓	Conduct air monitoring, per the SOFR instruction.
✓	Make necessary notifications.
✓	Ensure safety of personnel involved in spill response activities.
✓	Coordinate deployment of containment and recovery equipment.
✓	Designate staging areas for personnel and equipment.
✓	Coordinate activities of clean-up contractors.
✓	Set up Command Post, if warranted.

<b>Unconfirmed Report of a Leak</b>	
Procedures	
✓	Contact the Control Center and shut down line if a leak is suspected or pipeline integrity is compromised. Request Control Center for status of pipeline from their systems.
✓	Conduct aerial or ground reconnaissance of the area at the first possible opportunity (incident may occur at night or in inclement weather) and contact the Control Center to shut down line if reconnaissance detects a potential leak.
✓	Isolate line segment.
✓	Start internal and external notification procedures.
✓	Mobilize response and repair personnel.

Natural and other Gas Leaks	
Procedures	
✓	Immediately stop work activities
✓	Shut down and isolate flow
✓	Evacuate the area
✓	Eliminate sources of ignition
✓	All equipment used when handling product must be grounded
✓	Water spray may reduce vapors or divert vapor cloud
✓	If exposed, make sure exposed clothing is removed and decontamination occurs

Pipeline Station or Manifold Fire	
Procedures	
✓	Bear in mind it is better to take plenty of time in an emergency than to rush in and sustain personal injury.
✓	Personnel should immediately evacuate hazardous area.
✓	Extinguish fire at once, if possible, with the equipment at hand. <ul style="list-style-type: none"> <li>• If product cannot be shut off, it is better to let a controlled fire burn than to extinguish it as the fuel may spread and flashback occur.</li> </ul>
✓	<b>If telephone is not in hazardous area</b> , notify Supervisor and the Control Center and proceed to shut down as outlined in this Section above. <b>Call 911.</b>
✓	<b>If telephone is in hazardous area (it is not intrinsically safe)</b> , do not attempt to use it. <ol style="list-style-type: none"> <li>a) <b>Trip emergency shutdown control.</b></li> <li>b) Close fuel supply valve if the emergency shutdown control fails.</li> <li>c) Get information to Supervisor and fire department as quickly as possible by any available means.</li> </ol>
✓	Reduce fuel supply by: <ol style="list-style-type: none"> <li>a) Closing valves where possible.</li> <li>b) Close tank valves immediately.</li> <li>c) Close mainline fire gate valves on Supervisor's orders if not in the fire area. If in the fire area, the nearest upstream and downstream valves are to be closed.</li> </ol>
✓	Notify Facility Supervisor, Operations Supervisor, and Control Center. Notify all off-site personnel of Facility Emergency Incident.
✓	If foam is needed, contact necessary resources for assistance.
✓	Post guards at gates or roadways. Call for any help deemed necessary: ambulance, sheriff (to barricade roads, etc.).
✓	Isolate the fire as much as possible and control spreading to other properties by wetting with water.
✓	After the fire has been extinguished or controlled, permit only authorized personnel to go near the location.
✓	<b>Public Relations:</b> Contact Control Center to request media support as needed.

### Medical Emergency Checklist

#### Procedures

**Activate professional medical care for the victim by:**

Call **911** to arrange for ground or air ambulance support. Provide the 911 dispatch the following information:

- Your name and location
- Type of medical emergency
- Name and location of the injured
- Condition of injured
- Contact phone number

Transport injured to a local hospital or physician

✓

Caller's Name:

**Note:** Evacuation of seriously ill or injured persons should be conducted by ground or air ambulance only. **Transportation by company or private vehicle should be discouraged, unless advised to do so by medical authorities.** All medical emergencies should be documented and applicable emergency notifications completed.

## 6.7 Environmental Response

This section provides key information related to environmental response activities associated with an emergency response to a release. The discovery of a historical release (i.e. a release that occurred in the past that is not considered to be a new or ongoing release) may result in the need to initiate some or all of the activities described in the following sections of this Environmental Response section.

As a precaution, the Company's Environmental Manager should ensure the Federal and State Natural Resource Trustees have been contacted. State agency contact, State Natural Resource Trustee contacts and Federal contacts are listed in the Government Agencies Section of the ERD.

In the event of a release that requires an environmental response, the Company's Environment Department will immediately mobilize a preferred environmental consultant or consultants (see ERD for consultant contact information by state). The Company's Environment Department will staff the Environmental Unit within the ICS organizational structure and at a minimum; manage the following environmental related response activities:

- Environmental documentation
- Monitoring
- Site investigation and remediation
- Waste management
- Wildlife management
- Natural Resource Damage Assessment (NRDA)
- Environmental compliance
- Product volume tracking
- Administrative assistance

### 6.7.1 Environmental Documentation

Environmental documentation activities include: collect and retain site records; initial site survey; preparation of site figures; and preliminary reporting. Use of the U.S. EPA Unified Command Forms is recommended for record keeping.

Site Records include:

- Field notebooks
- Daily weather conditions (include wind direction and speed)
- Initial release information
  - Incident characteristics, product properties, extent of impacts, and site conditions
  - Product recovery/containment operations, including: amount of product recovered, recovery techniques (e.g., booms, vacuum recovery, etc.), and their locations
  - Areas affected by the release and threatened natural resources
  - Wildlife injury and impacts

- Regulatory Communication
  - Records of all notifications should include: time, date, agency, telephone number, individual contacted, and a summary of the conversation
  - Establish and distribute a general Enbridge email account to be copied on all emails to Federal, State and local regulators
  - Maintain a log of on-site agency personnel
- Photos
  - Include description of site and cardinal direction photographer is facing when photo was taken – Photos taken with a camera equipped or synchronized to a GPS are preferred
- Laboratory Data
  - Establish a standard protocol for sample naming at the onset of the response (e.g. Sampling and Analysis Plan)
  - Establish quality assurance (QA) and quality control (QC) objectives
  - Includes Chain of Custodies and laboratory reports
  - Collect and maintain post-processed GPS data of sample locations

An initial site survey may include an aerial or ground survey of the area affected by the release and adjacent areas with videotape and photographs to document:

- Extent and movement of the product
- Protection priorities for natural resources
- Natural resources that are affected and threatened by the release
- Sample locations and access areas
- Areas not affected by the release (e.g. background conditions, access and staging)

Site information to produce early in the project may include:

- Site/Release Location and Site Access (i.e. release location, extent of visual impacts, access roads, boat launches, boom deployment areas, safety zones, sign-in and security gates)
- Wetland Locations, sensitive natural resource areas (e.g. threatened and endangered species, high value waterways) and culturally significant resources
- Receptor Survey (may include: residential, commercial and industrial wells, residences, surface water intakes, and threatened and endangered species)

Preliminary reporting activities may include:

- Estimated volume of release
- Response activities
- Data presentation

### 6.7.2 Monitoring/Sampling Activities

Monitoring of the following media may be required, depending on the nature and location of the release:

- Air
- Surface water
- Groundwater
- Sediment
- Soil

#### Air Monitoring

Air monitoring will assess real-time hydrocarbon related compound concentrations and background air quality conditions as needed.

- A site action level will trigger the collection of confirmation analytical testing
- Grab analytical air samples will determine air quality for general public and site workers

#### Surface Water

Surface water sampling and monitoring procedures will be utilized to assess visible product and/or hydrocarbon sheen that may affect navigable waterways as well as to document background conditions within the waterways.

- Surface water samples will be collected periodically at each sample location to establish concentration changes over time
- Surface water samples will be collected at various depths within the water column periodically at each sample location to establish concentration changes over time
- GPS coordinates will be collected for sample locations to assist in re-sampling
- Location and frequency of the sample collection activities will be determined on a site-specific basis
- Surface water samples will be analyzed for laboratory and field parameters that will be determined on a site specific basis

#### Groundwater

Groundwater samples will be collected as necessary from public and private wells (residential, public utility, commercial and industrial) within a specified potential receptor zone around the site.

- State or county database will be used to identify wells
- Ground survey may also be conducted to assure all area wells are identified
- County Health Department will typically identify required buffer zone
- Groundwater samples will be analyzed for laboratory and field parameters that will be determined on a site specific basis

## Sediment

Sediment samples will be collected periodically to provide a base-line evaluation of current conditions and confirm the presence or absence of hydrocarbon impacts.

- Sample locations will be selected in the field based on topography, erosion features, water depth, water velocity and other indicators of sediment deposition
- GPS coordinates will be collected for sample locations to assist in re-sampling
- Shallow sediment samples (e.g. 0 to 2" depth) will generally be collected from areas of low potential for sediment deposition (i.e. strait, narrow and/or swiftly moving waterways)
- Deeper sediment samples (e.g. 0 to 6" depth) would generally be collected at locations with a high potential for sediment deposition (i.e. meandering, broad, and/or slowly moving waterways)
- Sediment samples will be analyzed for laboratory and field parameters that will be determined on a site specific basis

## Soil

Soil sampling will be completed to direct excavation activities, to confirm removal of hydrocarbon impacted soil or to document residual hydrocarbon impacts at the excavation limits.

- Location and quantity of samples will typically be determined by the extent of lateral and vertical hydrocarbon impacts
- Soil samples will be analyzed for laboratory and field parameters that will be determined on a site specific basis

### 6.7.3 Oil Sampling Procedures

The follow are a list of procedures to follow when obtaining an oil sample:

- Always wear latex or rubber gloves when taking samples. This protects the sample from your hands and your hands from the sample
- It is best to use a clean, clear glass jar for sampling. Four or six-ounce jars are sufficient. Dip or lower the jar (using string if necessary) into the oil or oily water at about a 30° angle. This may allow more oil and less water to flow over the lip of the jar. Do not fill the jar more than 2/3 full
- If sampling a small amount of light oil, such as a sheen, the oil can be collected more easily using a Teflon strip or sorbent pad that is transferred to a sample jar. Do not use anything containing organic fibers such as rag, cotton, cheesecloth, etc.; these may contaminate the sample, thus, giving improper analysis results
- Decanting the water may be necessary to get enough oil for analysis. To decant, fasten the lid on securely and turn the jar over allowing the water to settle towards the lid. Then unscrew the lid just enough to allow the excess water to slowly escape

- Fasten the lid after lining it with aluminum foil or Teflon to obtain a good seal. Affix the documentation label to the jar after wiping it clean and dry for the label to adhere. The label should identify the following information:
  - Date and time of sampling
  - Source/location of sample (be specific)
  - Name of person who took the sample
  - Sample designation using a sequential numbering or lettering system
  
- Samples should be delivered to a laboratory immediately for analysis. If samples cannot be delivered immediately, they should be temporarily stored in a refrigerator or a cool dark place since exposure to heat and light could affect the analysis. Samples should be transported in waterproof containers or wrapped in enough sorbent material to soak up the entire contents of the jar in case of leakage or breakage

#### **6.7.4 Site Investigation and Remediation Activities**

Initial site investigations will generally include determining the horizontal and vertical extent of the impacts. Equipment used to complete initial site investigation activities may include hand tools, drilling equipment and earth-moving equipment. Soil sampling for field screening and laboratory analysis will also be required. In addition to completing initial investigation activities, logistics and support for supplemental responders, other equipment should be procured and may include: boats, All-Terrain Vehicles, helicopters, and site-specific sampling equipment.

#### **6.7.5 Waste Management**

Waste management activities include the proper storage, characterization, treatment, disposal, and record-keeping of hydrocarbon impacted soil, water and investigation-derived waste.

Standard Operating Procedures (SOPs) should be established and EPA Guidelines associated with waste management should be followed, including:

- Waste Management Hotline SOPs
- Solid Waste Disposal SOPs
- USEPA Guidance Document EPA 530-D-02-002 Waste Sampling Technical Guidance
- Hazardous Waste Manifesting SOPs
- Additional project plans may be prepared in the context of a release response that are relevant, including site-specific waste management plan

Maintain a waste management hotline to provide a resource for contractors for larger releases that have multiple staging or waste accumulation areas:

- Coordinate the transportation and disposal with remote site
- Disposal questions (e.g. storage requirements and decontamination procedures)
- Requests (e.g. additional dumpsters, schedule a pick up)

Establish uniform procedures for segregation of waste and proper disposal of non-regulated and regulated solid waste, including:

- Waste container sorting/labeling (e.g. "Oily" and "Non-Oily")
- Routine waste management inspections
- Waste transportation
- Establish a list of approved waste disposal vendors for the site for each media, e.g. waste water (hazardous), waste water (non-hazardous), hazardous solids, and non-hazardous solids

Provide guidance on waste sampling activities, including:

- Proper waste stream sampling
- Analytical parameters
- Sampling frequency. Different frequencies may be appropriate for different waste streams (e.g. vegetation vs. contaminated debris)
- Sampling requirements (e.g. quality assurance/quality control samples)
- Analytical review (e.g. hazard evaluation, determination of applicable rules)

Waste manifesting and record keeping requirements include:

- Establishing uniform procedures for waste manifest tracking
- Environmental staff may want to designate a contractor or contractors to sign manifest and other specified documents (waste profiles, etc.) on behalf of the Company
- Maintain a waste manifest tracking spreadsheet, including columns for: waste stream identification (ID); manifest/bill of lading number; designated "receiving" facility EPA ID number; transporter EPA ID number; profile approval number; waste codes; amount shipped (and unit of measure); number of containers; date shipped; and comments, if applicable

#### **6.7.6 Wildlife Management**

Dead and injured wildlife found during response operations must be collected by trained and authorized personnel and properly documented. An inventory of dead, injured, rehabilitated and released wildlife needs to be maintained as a component of NRDA.

The following actions should be taken to minimize or prevent additional damages to wildlife:

- Avoid leaving any dead or injured wildlife in the impacted (oiled) area as it will encourage other wildlife to scavenge in contaminated areas
- Do not leave food or associated trash in the release area as it attracts wildlife to the contaminated area

### 6.7.7 Natural Resource Damage Assessment

Under the provision of CERCLA, the Oil Pollution Act of 1990 (OPA '90), and numerous state statutes, cost recovery can be obtained from industry for natural resource damage caused by the release of oil or hazardous substances to the environment. Natural resources are defined as land, air, biota, groundwater, and surface water. A Federal or State government entity, an Indian tribe or another nation acting as a public trustee of a natural resource may file claims for damages to natural resources.

A NRDA is used to determine damages for residual natural resource injuries. This assessment is often conducted by the public Trustee, the potential Responsible Party or both. During the assessment, the injured natural resources are identified, the extent of the injury is quantified and the extent of the economic damage resulting from the loss of services provided by the resources is determined. In addition, the assessment also determines the cost of restoration or replacement of the injured natural resource.

NRDA involves an assessment of the injury to natural resources and the loss of “services” (i.e., physical and biological functions provided by the resources) as a result of the petroleum release. If NRDA issues are anticipated, the type and condition of the natural resources before being impacted by the release will be determined by collecting soil and water samples as soon after the release as possible. These samples should be collected from areas which are threatened by spreading product, areas recently impacted by the product, and in the area of the release. Listed below in descending order of importance are locations typically sampled after a hydrocarbon release:

- River reaches immediately downstream (ahead) of the product plume (water and sediment samples)
- Wetlands and backwaters adjacent to and downstream of the product plume
- Areas freshly affected by the release
- The area adjacent to the release location (source area samples)
- Upstream areas unaffected by the release

Over the course of the response actions, the above locations may be re-sampled to evaluate the following:

- Changing extent and severity of impacts
- Fate and degradation of the hydrocarbon product over time
- Changing site conditions

### 6.7.8 Environmental Compliance

Environmental compliance includes, but is not limited to, preparing and submitting permit applications and completing associated field inspections. Permits and other compliance requirements that may be required on a release response include:

- NPDES permit application to discharge treated water, trench dewatering, stormwater impacted by construction activities in some states, and/or hydro-test water
- Wetland Delineation Report and Wetland Restoration Plans
- Joint Permit Application for wetland disturbances
- Air Emissions Inventory and Air Permit
- County Soil Erosion and Sediment Control Permit and associated inspections
- County Road and Drain Permits
- Wildlife Rehabilitation Permit
- Resource Conservation and Recovery Act (RCRA) Waste Rules, specifically the exemptions that are applicable/available (proper application of the “Recovered Oil vs. “Recovered Fuel” exemptions or exclusions)
- Clean Water Act emergency response actions

### 6.7.9 Product Volume Tracking

The EPA or State Agencies may require an estimate of the amount of product recovered. In order to provide relevant information, a uniform procedure for sampling, analyzing and calculating the amount of product recovered from remediation activities at the release location should be established for the site.

Product volume tracking requires identification of each waste stream. Examples of typical waste streams from an oil release include:

- Soil and/or sediment impacted by the hydrocarbon product (hazardous and non-hazardous)
- Debris (e.g., impacted sorbents, boom, pads, plastic, PPE, vegetation)
- Water (hazardous and non-hazardous)

A sampling protocol will be established for each waste stream and will include:

- Number of samples required per volume of waste generated
- Laboratory analysis required
- Data reporting requirements

In the case of a crude oil release, the data provided by the waste stream disposal contractors (e.g. volumes converted to mass) and the validated analytical results (Oil and Grease in mg/kg) may be used as a basis to calculate the amount of crude oil recovered per waste load. These calculations will be maintained in a “Daily Waste Load Summary” spreadsheet.

## 6.8 Containment and Recovery

### 6.8.1 Protection Technique Selection

Technique	Description	Primary Logistical Requirements	Use Limitations <sup>1</sup>	Potential Environmental Effects
<b>Spills on Land</b>				
A. Containment / Diversion Berms	Construct earthen berms ahead of advancing surface spill to contain spill or divert it to a containment area.	<u>Equipment*</u> 1 backhoe, bulldozer, front-end loader, or set of hand tools  <u>Personnel</u> 4-8 Workers	<ul style="list-style-type: none"> <li>Steep Slopes</li> <li>Porous substrate</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance to surface soils and vegetation</li> <li>Increased oil penetration</li> </ul>
B. Storm Drain Blocking	Block drain opening with sediments, plastic sheet, boards, etc. and prevent oil from entering drain.	<u>Equipment*</u> Misc. hand tools, 1 board, plastic sheet, mat, etc.  <u>Personnel</u> 1-2 Workers	<ul style="list-style-type: none"> <li>May be advantageous for oil to enter drain</li> <li>Heavy precipitation</li> </ul>	<ul style="list-style-type: none"> <li>Increased oil penetration</li> <li>Oil can spread to other areas</li> </ul>
C. Blocking Dams	Construct dam in drainage course/stream bed to block and contain flowing oil. Cover with plastic sheeting. If water is flowing, install inclined pipes during dam construction to pass water underneath.	<u>Equipment*</u> 1 backhoe, bulldozer, front-end loader, or set of hand tools, 1 plastic sheeting roll  <u>Personnel</u> 4-6 Workers	<ul style="list-style-type: none"> <li>Upstream storage capacity</li> <li>Flowing water</li> </ul>	<ul style="list-style-type: none"> <li>Increased oil penetration</li> </ul>
D. Culvert Blocking	Block culvert opening with plywood, sediments, sandbags, etc. to prevent oil from entering culvert	<u>Equipment*</u> Misc. hand tools, misc. plywood, sandbags, etc.  <u>Personnel</u> 3-4 Workers	<ul style="list-style-type: none"> <li>Upstream storage capacity</li> <li>Flowing water</li> </ul>	<ul style="list-style-type: none"> <li>Increased oil penetration</li> </ul>
E. Interception Trench	Excavate ahead of advancing surface/ near-surface spill to contain oil. Cover bottom and down gradient side with plastic.	<u>Equipment*</u> 1 backhoe or set of hand, tools, misc. plastic sheeting  <u>Personnel</u> 3-6 Workers	<ul style="list-style-type: none"> <li>Slope</li> <li>Depth to near-surface flow</li> </ul>	<ul style="list-style-type: none"> <li>Increased oil penetration</li> <li>Disturbance to surface soils and vegetation</li> </ul>

### 6.8.1 Protection Technique Selection (Cont'd)

Technique	Description	Primary Logistical Requirements	Use Limitations <sup>1</sup>	Potential Environmental Effects
<b>Spills on Water</b>				
F. Diversion Booming	Boom is deployed from the shoreline at an angle towards the approaching slick and anchored or held in place with a work boat. Oil is diverted towards the shoreline for recovery.	<u>Equipment*</u> 1 boat, 3 anchor systems (min), 100 feet boom (min)  <u>Personnel</u> 3 workers plus boat crew	<ul style="list-style-type: none"> <li>• Currents &gt;2-3 kts</li> <li>• Waves &gt; 1-2 ft.</li> <li>• Water depth &gt;50 feet (anchoring)</li> <li>• Sensitive shorelines</li> </ul>	<ul style="list-style-type: none"> <li>• Minor substrate disturbance at anchor points</li> <li>• Heavy oiling at shoreline anchor point</li> </ul>
G. Narrow Channel Containment Booming	Boom is deployed across entire river channel at an angle to contain floating oil passing through channel.	<u>Equipment*</u> 1 boat, vehicle, or winch; 1-2 booms (1.2 x channel width each); 2-10 anchor systems  <u>Personnel</u> 2-3 Workers	<ul style="list-style-type: none"> <li>• Currents &gt;2-3 kts</li> <li>• Water depth &gt;50 feet (anchoring)</li> <li>• Sensitive shorelines</li> </ul>	<ul style="list-style-type: none"> <li>• Minor substrate disturbance at anchor points</li> <li>• Heavy shoreline oiling at downstream anchor point</li> </ul>
H. Sorbent Barriers	A barrier is constructed by installing two parallel lines of stakes across a channel, fastening wire mesh to the stakes, and filling the space between with sorbents.	<u>Equipment*</u> (per 100 ft. of barrier): misc. hand tools, 1 boat, 20 fence posts, 200 ft. wire mesh, 200 ft <sup>2</sup> sorbents, misc. fasteners, support lines, additional stakes, etc.  <u>Personnel</u> 2-3 Workers	<ul style="list-style-type: none"> <li>• Water depths &gt;5-10 feet</li> <li>• Currents &gt;0.5 kts</li> <li>• Soft substrate</li> </ul>	<ul style="list-style-type: none"> <li>• Minor substrate disturbance at post and shoreline anchor points</li> <li>• High substrate disturbance if boat is not used</li> </ul>
I. Exclusion Booming	Boom is deployed across or around sensitive areas and anchored in place. Approaching oil is excluded from area.	<u>Equipment*</u> (per 500 ft. of boom): 1 boat, 6 anchor systems, 750 ft. boom (min)  <u>Personnel</u> 3 workers plus boat crew	<ul style="list-style-type: none"> <li>• Currents &gt;1-2 kts</li> <li>• Waves &gt;1-2 feet</li> <li>• Water depth &gt;50 feet (anchoring)</li> </ul>	<ul style="list-style-type: none"> <li>• Minor substrate disturbance at anchor points</li> </ul>

### 6.8.1 Protection Technique Selection (Cont'd)

Technique	Description	Primary Logistical Requirements	Use Limitations <sup>1</sup>	Potential Environmental Effects
<b>Spills on Water (Cont'd)</b>				
J. Deflection Booming	Boom is deployed from the shoreline away from the approaching slick and anchored or held in place with a work boat. Oil is deflected away from shoreline.	<u>Equipment*</u> 1 boat, 5 anchor systems, boom (200 feet)  <u>Personnel</u> 3 workers plus boat crew	<ul style="list-style-type: none"> <li>• Currents &gt;2-3 kts</li> <li>• Waves &gt;1-2 feet</li> <li>• Water depth &gt;50 feet (anchoring)</li> <li>• Onshore winds</li> </ul>	<ul style="list-style-type: none"> <li>• Minor substrate disturbance at anchor points</li> <li>• Oil is not contained and may contact other shorelines</li> </ul>
K. Inlet Dams	A dam is constructed across the inlet or channel using local shoreline sediments to prevent oil from entering inlet. Dam can be covered with plastic to minimize erosion.	<u>Equipment*</u> 1 backhoe, bulldozer, front-end loader, or set of hand tools, 1 plastic sheeting roll  <u>Personnel</u> 2-6 workers	<ul style="list-style-type: none"> <li>• Water outflow</li> <li>• Inlet depth &gt;5 feet</li> <li>• Excessive inlet width</li> </ul>	<ul style="list-style-type: none"> <li>• Sediment/vegetation disturbance at borrow areas</li> <li>• Inlet substrate disturbance</li> <li>• Increases suspended sediments</li> <li>• Water in inlet can become stagnant</li> </ul>
L. Debris / Ice Exclusion	Install fence barrier upstream of containment site to exclude debris/ice	<u>Equipment*</u> (per 100 ft. of barrier): misc. hand tools, 1 boat, 10 fence posts, 100 feet cyclone fence, misc. fasteners, support lines, etc.  <u>Personnel</u> 2-3 workers	<ul style="list-style-type: none"> <li>• Water depth &gt;5-10 feet</li> <li>• Currents &gt;3-4 kts</li> <li>• Soft substrate</li> </ul>	<ul style="list-style-type: none"> <li>• Minor substrate disturbance at post and anchor points</li> </ul>

<sup>1</sup> In addition to implementation and accessibility.

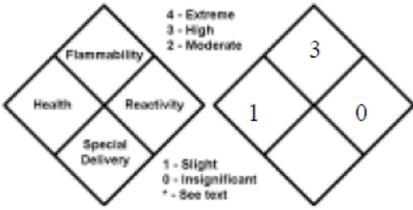
\* Need to establish a safe perimeter and follow safety precautions as appropriate before work begins.

## 6.9 Material Safety Data Sheet (MSDS)

### Sweet Crude Oil (MSDS)



### MATERIAL SAFETY DATA SHEET

24-HOUR EMERGENCY ASSISTANCE	GENERAL ASSISTANCE	<b>NFPA DIAMOND *</b> 	
Gas Control CHEMTREC Assistance	(888) 650-8099 (800) 424-9300		Phone (713) 650-8900 Fax (713) 821-2080
MSDS NUMBER 1005			

MANUFACTURER/SUPPLIER: **Enbridge, (U.S.), Inc.**  
1100 Louisiana Street, Suite 2900  
Houston, Texas 77002

#### 1. PRODUCT IDENTIFICATION

### CRUDE OIL, SWEET

<b>Product Name</b>	Crude Oil – Sweet
<b>Synonym/Product Name:</b>	Field Crude, Separator Crude
<b>Chemical Family:</b>	Petroleum Hydrocarbon
<b>Molecular Formula:</b>	Mix of heavy hydrocarbons
<b>Molecular Weight:</b>	Varies

#### 2. PRODUCT HAZARD SUMMARY

**Health:** May contain or liberate poisonous hydrogen sulfide gas. Cancer hazard. Overexposure may cause damage to the peripheral nervous system. Use ventilation adequate to keep exposures below recommended limits. Avoid breathing vapor or mist. Avoid contact with eyes, skin or clothing. Do not taste or swallow. Wash thoroughly after handling.  
HMIS Classification for Health: 1

**Flammability:** Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 3

**Reactivity:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 0

### 3. PRODUCT HEALTH HAZARD INFORMATION

**Ingestion:** Low degree of toxicity by ingestion.

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**Skin:** Contact may cause mild skin irritation including redness, burning and drying and cracking of the skin. No harmful effects from skin absorption are expected.

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**Eye:** Contact may cause mild eye irritation, including stinging, watering, redness and swelling.

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**Inhalation:** Low to moderate degree of toxicity by inhalation.

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**Signs and Symptoms:** Effects of overexposure may include irritation of the nose, throat and digestive tract, nausea, vomiting, diarrhea, transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination and fatigue).

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**Cancer:** A component is a known human cancer hazard (see Special Toxic Effects below).

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**Target Organs:** Overexposure to a component may cause injury to the peripheral nervous system. There is limited evidence from animal studies that overexposure may cause injury to the male reproductive system.

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**Pre-Existing Medical Conditions:** Conditions aggravated by exposure may include skin, respiratory (asthma-like), male reproductive and peripheral nerve disorders. Exposure to high concentrations of this material may increase the sensitivity of the heart to certain drugs. Persons with pre-existing heart disorders may be more susceptible to this effect.

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**Comments:** While this material is sweet crude oil, this material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue, so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure and death.

ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil

**Special Toxic Effects:**

**Crude Oil**

**Carcinogenicity:** Chronic application of crude oil to mouse skin resulted in an increase of skin tumors. Crude oil has been identified as a carcinogen by IARC.

**Developmental:** Dermal exposure to crude oil during pregnancy resulted in limited evidence of developmental toxicity in laboratory animals. Decreased fetal weight and increased resorptions were noted at maternally toxic doses. No significant effects on pup growth or other developmental landmarks were observed postnatally.

**n-Hexane (CAS 110-54-3)**

**Target Organs** – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

**Benzene (CAS 71-43-2)**

**Carcinogenicity:** Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

**4. FIRST AID**

**Ingestion:** First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

**Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.

**Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

**Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil

**Notes to Physician:** Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

This material contains hydrogen sulfide. In high doses, hydrogen sulfide may produce pulmonary edema, and respiratory depression or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. If unresponsive, nitrites may be an effective antidote.

## 5. PERSONAL PROTECTION INFORMATION

**Eye Protection:** Approved eye protection to safeguard against potential eye contact, irritation or injury is recommended. Depending on conditions of use, a face shield may be necessary.

**Skin Protection:** The use of gloves impermeable to the specific material handled is advised to prevent skin contact and possible irritation.

**Respiratory Protection:** Wear a positive pressure air supplied respirator in situations where there may be potential for airborne exposure to H<sub>2</sub>S above exposure limits. H<sub>2</sub>S has poor warning properties and appropriate air purifying cartridges are not commercially available. A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where H<sub>2</sub>S is not detected, and airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

## 6. PHYSICAL PROPERTIES

<b>Boiling Point:</b>	100-1000°F
<b>Specific Gravity:</b>	0.74 – 0.99 @ 39.2°F (Water = 1)
<b>Freezing/Melting Point:</b>	ND

ND = No Data

NA = Not Applicable

**MSDS NO: 1005  
Crude Oil**

% Volatile:	ND
Vapor Pressure:	ND
Vapor Density (Air = 1):	ND
Viscosity	ND
% Solubility in Water:	0%
Density (lb/gal)	Varies, but estimated at 7.2 lb/gal
Physical State:	Liquid
pH:	ND
Appearance:	Light tan, yellowish or greenish to black
Odor:	Petroleum smell

## 7. FIRE AND EXPLOSION DATA

Flash Point	<100°F
Autoignition Temperature:	ND
Flammability Limits In Air (% By Vol.) Lower:	0.9
Flammability Limits In Air (% By Vol.) Upper:	7.0

**Basic Fire Fighting Procedures:** Long-duration fires involving crude oil stored in tanks may result in a boilover. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boilover is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

**Extinguishing Media:** Dry chemical, carbon dioxide or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

**Unusual Fire and Explosion Hazards:** This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil

## 8. REACTIVITY DATA

**Stability/Incompatibility:** Stable under normal conditions of storage and handling. Flammable liquid and vapor. Vapor can cause flash fire.

Avoid contact with strong oxidizing agents.

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**Hazardous Reaction/Decomposition Products:** Combustion can yield carbon dioxide, carbon monoxide, other organic compounds and sulfur oxides.

## 9. ENVIRONMENTAL INFORMATION

**Spill or Release to the Environment:** Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify the National Response Center (800-424-8802).

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**Notification:** Notify fire authorities and appropriate federal, state and local agencies.

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**Waste Disposal:** This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristics of ignitability (D001), benzene (D018) and possibly reactivity (D003). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this waste is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

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ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil

**Sara Title III Information:** This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Hydrogen Sulfide	CAS – 7783-06-4	Weight % - <1.0
n-Hexane	CAS – 110-54-3	Weight % - 0-2
Benzene	CAS – 71-43-2	Weight % - 0 – 0.1

## 10. REGULATORY INFORMATION

**EPA Reportable Quantity:** The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 10,000 pounds of crude oil (1388 gallons). The RQ is based on 0.1 wt. % benzene.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds, which equals 250,000 pounds of crude oil (34,722 gal). The RQ is based on 2 wt. % n-Hexane.

## 11. SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

**Handling/Storage:** The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits. Use good personal hygiene practice.

Keep containers tightly closed. In a tank, barge or other closed container, the vapor space above the materials that contain hydrogen sulfide may result in concentrations immediately dangerous to life and health (IDLH). Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area "No Smoking or Open Flame". Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

**Empty Containers:** "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil

## 12. TRANSPORTATION REQUIREMENTS

### General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101): Petroleum Crude Oil  
 DOT Hazard Classes (49 CFR 172.101): 3  
 UN/NA Code (49 CFR 172.101): UN1267  
 Packing Group (49 CFR 172.101): I  
 Bill of Lading Description (49 CFR 172.202): Petroleum Crude Oil  
 DOT Labels Required (49 CFR 172.101): Flammable Liquid

## 13. INGREDIENTS/HEALTH HAZARD INFORMATION

Component	CAS NO.	Typical %* by weight	EXPOSURE GUIDELINE	
			PPM	Agency - Type
Crude Oil	8002-05-9	100	Not Established	
n-Hexane	110-54-3	0-2	50 500	ACGIH – TWA OSHA – TWA
Hydrogen sulfide	7783-07-5	<1	10 15 20 10	ACGIH – TWA ACGIH – STEL OSHA – CEIL MSHA – TWA
Benzene	71-43-2	0 – 0.1	0.5 2.5 1 5 25	ACGIH – TWA, Skin ACGIH – STEL, Skin OSHA – TWA OSHA – STEL MSHA – CEIL, Skin

Note that state, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.

ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil



REVISION DATE: 07/31/02

REPLACES SHEET DATED: NA

COMPLETED BY: Enbridge (US) Inc. EHS Department

NOTE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

ND = No Data

NA = Not Applicable

MSDS NO: 1005  
Crude Oil

UHC Sweet Crude Oil (MSDS)

# Material Safety Data Sheet



1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

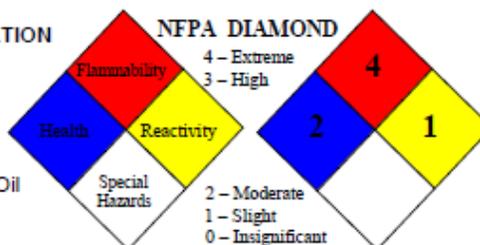
Manufacturer/Supplier: Enbridge Pipelines Inc.  
10201- Jasper Avenue  
Edmonton, Alberta T5J 3N7  
CANADA

Product Name: US. High Sweet Clearbrook (UHC) Crude Oil  
Synonyms: Hydrocarbons of Petroleum

General Information: 780-420-5306

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA  
CANUTEC 613-996-6666 Canada

Date Prepared: 06/17/2011



2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Wt./Vol.	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Petroleum Hydrocarbons	68919-39-1	100	N/A	N/A	N/A
1,2-dimethylcyclopentane	28729-52-4	1.8	None	None	None
2-methylhexane	591-76-4	1.0	None	None	None
2-methylpentane	107-83-5	1.8	None	500	100
3-methylhexane	589-34-4	1.6	None	None	None
3-methylpentane	96-14-0	1.3	None	500	100
2-methylheptane	592-27-8	1.4	None	300	None
Benzene	71-43-2	0.4	1	0.5	0.1
cyclohexane	110-82-7	1.0	300	100	300
i-pentane	109-66-0	1.8	1000	600	120
methylcyclohexane	108-87-2	2.3	500	400	400
methylcyclopentane	96-37-7	2.2	None	None	None
n-butane	106-97-8	1.9	800	1000	800
n-heptane	142-82-5	3.4	500	400	85
n-Hexane	110-54-3	3.4	50	50	50
n-Pentane	109-66-0	3.4	600	600	120
n-octane	111-65-9	3.0	500	300	75

n-nonane	111-84-2	2.2	None	200	200
n-decane	124-18-5	2.0	None	None	None
n-undecane	1120-21-4	1.7	None	None	None
n-dodecane	112-40-3	1.5	None	None	None
n-tridecane	629-50-5	1.3	None	None	None
Toluene	108-88-3	0.9	100	20	100
Hydrogen sulfide	7783-06-4	<0.00001	20 <sup>Ceiling</sup>	1	10 <sup>Ceiling</sup>
Ethylbenzene	100-41-4	0.6	100	20	100
Xylenes	1330-20-7	0-5	100	100	100

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.  
N/A - Not Available

### 3 – HAZARDS IDENTIFICATION

**Flammability:** Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 4

**Stability:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 1

#### Potential Health Effects from Overexposure

*Acute Effects:*

**Ingestion:** Ingestion may result in nausea, vomiting, diarrhea and central nervous system depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

**Skin Contact:** Prolonged and repeated contact may cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

**Eye Contact:** Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness and swelling. Hydrogen sulfide (H<sub>2</sub>S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.

**Inhalation:** Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract and may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

*Chronic Health Effects from Overexposures:*

Skin and eye irritation. May affect the respiratory and central nervous systems.

*Special Toxic Effects:*

n-Hexane (CAS 110-54-3)

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

**Benzene (CAS 71-43-2)**

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

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**4 – FIRST AID MEASURES**

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.
- Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

**Notes to Physician:** Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

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**5 – Exposure Controls/ Personal Protection**

- Eye Protection:** Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.
- Skin Protection:** The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.
- Respiratory Protection:** A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators

may not provide adequate protection. A respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

#### 6 – FIRE FIGHTING MEASURES

Flash Point:	< 40 °C	Lower Explosive Limit:	Not Established
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Not Established

**Basic Fire Fighting Procedures:** Long-duration fires involving diluent stored in tanks may result in a boilover. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boilover is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

**Extinguishing Media:** Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO<sub>2</sub>, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

**Unusual Fire and Explosion Hazards:** This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

#### 7 – ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

**Spill management:** Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dike and contain land spills; contain water spills by booming. For large spills remove by mechanical means such as vacuuming or pumping and place in containers. All equipment used when

handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

Reporting: Report spills to local or federal authorities as appropriate or required.

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## 8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H<sub>2</sub>S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before unloading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

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## 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to brown liquid
Physical Form:	Liquid
Substance type (Pure/Mixture):	Mixture
Boiling Temperature:	94 to 1330 °F
Melting Temperature:	Not determined
Vapor Pressure:	about 7.47 psi
Vapor Density:	1.0 - 3.9
Evaporation Rate:	(Ethyl ether =1) >1
Specific Gravity:	0.82
Water Solubility:	Negligible
pH:	Not determined
Viscosity:	5.43 mm <sup>2</sup> /s
Color:	Clear to brown
Odor:	Rotten egg, petroleum like odor

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## 10 – STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
CHEMICAL STABILITY:	Stable at 70 °F, 760 mmHg pressure.
HAZARDOUS DECOMPOSITION PRODUCTS:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
HAZARDOUS POLYMERIZATION:	Will not occur
INCOMPATIBILITY:	Strong oxidizers such as nitrates, chlorates, peroxides.

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## 11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific, sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H<sub>2</sub>S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H<sub>2</sub>S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H<sub>2</sub>S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H<sub>2</sub>S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H<sub>2</sub>S, respectively. Over the years a number of acute cases of H<sub>2</sub>S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats subchronically exposed to high concentrations of xylenes.

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## 12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law

requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

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### 13 – ENVIRONMENTAL INFORMATION

**Spill or Release to the Environment:** Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 – 2%
n-Hexane	CAS – 110-54-3	Weight % - up to 11%
Benzene	CAS – 71-43-2	Weight % - 0 – 2%

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### 14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification:           Class B2 Flammable Liquids  
  Class D2B Other Toxic Effects - Skin Irritant  
  Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity: The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 3,333 pounds of natural gas condensate (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene – The RQ for toluene is 1000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 2 wt. % toluene.

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#### 15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area "No Smoking or Open Flame". Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of natural gas condensate, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, "Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production," for additional information.

Empty Containers: "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

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#### 16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101):	Petroleum Crude Oil
DOT Hazard Classes (49 CFR 172.101):	3
UN/NA Code (49 CFR 172.101):	UN1267
Packing Group (49 CFR 172.101):	II
Bill of Lading Description (49 CFR 172.202):	Petroleum Crude Oil
DOT Labels Required (49 CFR 172.101):	Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Distillate n.o.s. 1268, Gasoline UN1203, Flammable liquids, n.o.s. (pentane) UN1993 or Hydrocarbons, Liquid n.o.s. (condensate) UN3295.

PREPARED BY: Enbridge Pipelines Inc.

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#### Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

#### ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m <sup>3</sup>	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

Light Crude Oil (MSDS)

# Material Safety Data Sheet



## 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer/Supplier: Enbridge Pipelines Inc.  
10201- Jasper Avenue  
Edmonton, Alberta T5J 3N7  
CANADA

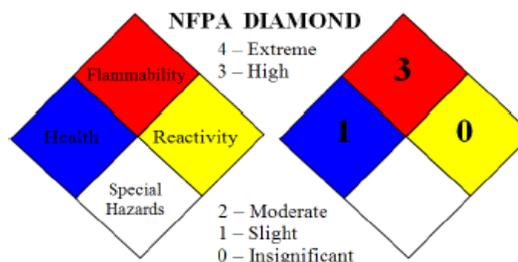
Product Name: Crude Oil - Light

Synonyms: Petroleum Crude Oil, bitumen blend - light

General Information: 780-420-5306

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA  
CANUTEC 613-996-6666 Canada

Date Prepared: 09/22/2009



## 2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Weight	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Crude Oil	8002-05-09	100	N/A	N/A	N/A
Methane	74-82-8	<0.1	N/A	1000	N/A
Ethane	74-84-0	<0.1	N/A	1000	N/A
Propane	74-98-6	<0.3	1000	1000	1000
Iso-Butane	75-28-5	<1	800	1000	800
n-Butane	106-97-8	1-3	800	1000	800
Hexane	110-54-3	1-20	50	50	50
n-Pentane	109-66-0	1-20	600	600	120
Iso-Pentane	92046-46-3	1-20	600	600	120
Heptane	142-82-5	1-20	400	400	85
Octane	111-65-9	1-20	300	300	75
Nonane	111-84-2	1-10	N/A	200	200
Decane	124-18-5	1-5	N/A	N/A	N/A
neoHexane	75-83-2	<0.5	N/A	N/A	N/A
Benzene	71-43-2	0-3	1	0.5	0.1
Toluene	108-88-3	0-3	100	20	100
Methylcyclohexane	108-87-2	1-5	500	400	400

Hydrogen sulfide	7783-06-4	<1	20 <sup>Ceiling</sup>	10	10 <sup>Ceiling</sup>
Ethylbenzene	100-41-4	<1	100	100	100
Xylenes	1330-20-7	1-3	100	100	100
Trimethylbenzene	2551-13-7	<1	25	25	25
C11 – C62 Hydrocarbons	N/A	10-70	N/A	N/A	N/A

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.  
N/A - Not Available

### 3 – HAZARDS IDENTIFICATION

**Flammability:** Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 3

**Stability:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 0

#### Potential Health Effects from Overexposure

*Acute Effects:*

- Ingestion:** Ingestion may result in nausea, vomiting, diarrhea and central nervous system depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.
- Skin Contact:** Prolonged and repeated contact may cause defecing and drying of the skin and can lead to irritation and/or dermatitis.
- Eye Contact:** Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness, and swelling. Hydrogen sulfide (H<sub>2</sub>S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.
- Inhalation:** Prolonged or excessive exposure may cause irritation to the nose, throat, lungs, and respiratory tract and may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

*Chronic Health Effects from Overexposures:*

Skin and eye irritation. May affect the respiratory and central nervous systems.

*Special Toxic Effects:*

**Hydrogen sulfide (CAS 7783-06-40)**

Target organs - Hydrogen sulfide is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system.

Low concentrations- can irritate the eyes, nose, throat and respiratory system.

Moderate concentrations- can cause severe eye and respiratory irritation (including coughing, difficulty breathing, and accumulation of fluid in the lungs), headache, dizziness, nausea, vomiting, staggering and excitability.

High concentrations- can cause shock, convulsions, inability to breathe, rapid unconsciousness, coma, and death. Effects can occur within in one or a few breaths.

n-Hexane (CAS 110-54-3)

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Toluene (CAS 108-88-3)

Target Organs – Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Sub-chronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system damage in lab animals.

Developmental – Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in lab animals.

Benzene (CAS 71-43-2)

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

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#### 4 – FIRST AID MEASURES

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.
- Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.
- Notes to Physician:** Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

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## 5 – Exposure Controls/ Personal Protection

**Eye Protection:** Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.

**Skin Protection:** The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.

**Respiratory Protection:** A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

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## 6 – FIRE FIGHTING MEASURES

Flash Point:	< 50 °F	Lower Explosive Limit:	Varies, est. 1%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 13%

**Basic Fire Fighting Procedures:** Long-duration fires involving crude oil stored in tanks may result in a boil over. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boil over is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

**Extinguishing Media:** Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO<sub>2</sub>, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

*Unusual Fire and Explosion Hazards:* This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

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## 7 – ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

**Spill management:** Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dikes and ditches contain land spills and water spills by booming. For large spills remove by mechanical means such as vacuuming or pumping and place in containers. All equipment used when handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

**Reporting:** Report spills to local or federal authorities as appropriate or required.

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## 8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H<sub>2</sub>S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before uploading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

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## 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Clear to brown liquid
<b>Physical Form:</b>	Liquid
<b>Substance type (Pure/Mixture):</b>	Mixture
<b>Boiling Temperature:</b>	<95- to 1100 °F
<b>Melting Temperature:</b>	Not determined
<b>Vapor Pressure:</b>	Not determined
<b>Vapor Density:</b>	1.0 - 3.9

Evaporation Rate:	(Ethyl ether =1) >1
Specific Gravity:	0.3 - 0.75
Water Solubility:	Negligible
pH:	Not determined
Viscosity:	Not determined
Color:	Clear to brown
Odor:	Rotten egg, petroleum like odor

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## 10 – STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
CHEMICAL STABILITY:	Stable at 70 °F, 760 mmHg pressure.
HAZARDOUS DECOMPOSITION PRODUCTS:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
HAZARDOUS POLYMERIZATION:	Will not occur
INCOMPATIBILITY:	Strong oxidizers such as nitrates, chlorates, peroxides.

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## 11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H<sub>2</sub>S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H<sub>2</sub>S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H<sub>2</sub>S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H<sub>2</sub>S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H<sub>2</sub>S, respectively. Over the years a number of acute cases of H<sub>2</sub>S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats sub-chronically exposed to high concentrations of xylenes.

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## 12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

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## 13 – ENVIRONMENTAL INFORMATION

**Spill or Release to the Environment:** Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Place dikes far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 -3%
Hexane	CAS – 110-54-3	Weight % - 1-20%
Benzene	CAS – 71-43-2	Weight % - 0-3%

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## 14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification: Class B2 Flammable Liquids  
Class D2B Other Toxic Effects - Skin Irritant  
Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity: The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 3,333 pounds of crude oil (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene – The RQ for toluene is 1000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 2 wt. % toluene.

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#### 15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area “No Smoking or Open Flame”. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of crude oil, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, “Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production,” for additional information.

Empty Containers: “Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material refer to OSHA regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

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#### 16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101): Petroleum Crude Oil  
DOT Hazard Classes (49 CFR 172.101): 3  
UN/NA Code (49 CFR 172.101): UN1267  
Packing Group (49 CFR 172.101): I  
Bill of Lading Description (49 CFR 172.202): Petroleum Crude Oil  
DOT Labels Required (49 CFR 172.101): Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Distillate n.o.s. 1268, Flammable liquids, n.o.s. (pentane) UN1993 or Hydrocarbons, Liquid n.o.s. UN3295.

PREPARED BY: Enbridge Pipelines Inc.

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#### **Disclaimer**

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

#### **ABBREVIATIONS**

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m <sup>3</sup>	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

Heavy Crude Oil (MSDS)

# Material Safety Data Sheet



## 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

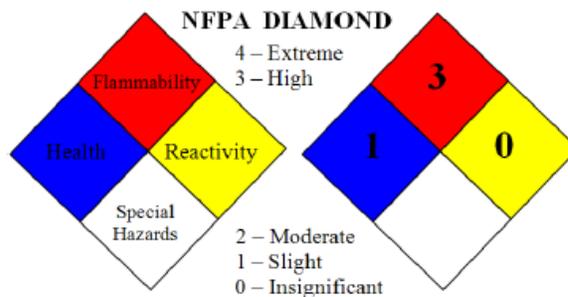
Manufacturer/Supplier: Enbridge Pipelines Inc.  
10201- Jasper Avenue  
Edmonton, Alberta T5J 3N7  
CANADA

Product Name: Crude Oil - Heavy  
Synonyms: Heavy petroleum crude, heavy crude

General Information: 780-420-5306

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA  
CANUTEC 613-996-6666 Canada

Date Prepared: 09/22/2009



## 2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Weight	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Crude Oil	8002-05-09	100	N/A	N/A	N/A
Methane	74-82-8	<0.1	N/A	1000	N/A
Ethane	74-84-0	<0.1	N/A	1000	N/A
Propane	74-98-6	<0.1	1000	1000	1000
Iso-Butane	75-28-5	<1	800	1000	800
n-Butane	106-97-8	<1	800	1000	800
Hexane	110-54-3	1-3	50	50	50
n-Pentane	109-66-0	<1	600	600	120
Iso-Pentane	92046-46-3	<1	600	600	120
Heptane	142-82-5	1-3	400	400	85
Octane	111-65-9	1-3	300	300	75
Nonane	111-84-2	1-3	N/A	200	200
Decane	124-18-5	1-3	N/A	N/A	N/A
neoHexane	75-83-2	<0.1	N/A	N/A	N/A
Benzene	71-43-2	<5	1	0.5	0.1
Toluene	108-88-3	<1	100	20	100

Methylcyclohexane	108-87-2	<1	500	400	400
Hydrogen sulfide	7783-06-4	<1	20 <sup>Ceiling</sup>	10	10 <sup>Ceiling</sup>
Ethylbenzene	100-41-4	<1	100	100	100
Xylenes	1330-20-7	<1	100	100	100
Trimethylbenzene	2551-13-7	<1	25	25	25
C11 – C62 Hydrocarbons	N/A	70 – 90	N/A	N/A	N/A

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.

N/A - Not Available

### 3 – HAZARDS IDENTIFICATION

**Flammability:** Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as; static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 3

**Stability:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 0

#### Potential Health Effects from Overexposure

##### Acute Effects:

**Ingestion:** Ingestion may result in nausea, vomiting, diarrhea and central nervous system, and depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

**Skin Contact:** Prolonged and repeated contact may cause deflating and drying of the skin, and can lead to irritation and/or dermatitis.

**Eye Contact:** Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness and swelling. Hydrogen sulfide (H<sub>2</sub>S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.

**Inhalation:** Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract which may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

##### Chronic Health Effects from Overexposures:

Skin and eye irritation. May affect the respiratory and central nervous systems.

##### Special Toxic Effects:

##### Hydrogen sulfide (CAS 7783-06-40)

Target organs - Hydrogen sulfide is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system.

Low concentrations- can irritate the eyes, nose, throat and respiratory system.

Moderate concentrations- can cause severe eye and respiratory irritation (including coughing, difficulty breathing, and accumulation of fluid in the lungs), headache, dizziness, nausea, vomiting, staggering and excitability.

High concentrations- can cause shock, convulsions, inability to breathe, rapid unconsciousness, coma, and death. Effects can occur within in one or a few breaths.

**n-Hexane (CAS 110-54-3)**

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

**Toluene (CAS 108-88-3)**

Target Organs – Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Sub-chronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system damage in lab animals.

Developmental – Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in lab animals.

**Benzene (CAS 71-43-2)**

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

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#### **4 – FIRST AID MEASURES**

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.
- Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

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#### 5 – Exposure Controls/ Personal Protection

**Eye Protection:** Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.

**Skin Protection:** The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.

**Respiratory Protection:** A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program should be used that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88 standards. 2 requirements must be followed when workplace conditions warrant a respirator's use.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

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#### 6 – FIRE FIGHTING MEASURES

Flash Point:	< 100 °F	Lower Explosive Limit:	Varies, est. 1%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 13%

**Basic Fire Fighting Procedures:** Long-duration fires involving crude oil stored in tanks may result in a boil over. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boil over is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

**Extinguishing Media:** Any extinguisher capable of handling Class B fires is recommended including extinguishing media such as CO<sub>2</sub>, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment,

unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

*Unusual Fire and Explosion Hazards:* This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

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## 7 – ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Spill management: Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dikes and ditches contain land spills and water spills by booming. For large spills remove by mechanical means such as vacuuming or pumping and place in containers. All equipment used when handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

Reporting: Report spills to local or federal authorities as appropriate or required.

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## 8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H<sub>2</sub>S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before uploading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

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## 9 – PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Clear to brown thick liquid  
**Physical Form:** Liquid

<b>Substance type (Pure/Mixture):</b>	Mixture
<b>Boiling Temperature:</b>	-4 to 2012 °F
<b>Melting Temperature:</b>	Not determined
<b>Vapor Pressure:</b>	Not determined
<b>Vapor Density:</b>	1.0 - 3.9
<b>Evaporation Rate:</b>	(Ethyl ether =1) >1
<b>Specific Gravity:</b>	0.3 - 0.75
<b>Water Solubility:</b>	Negligible
<b>pH:</b>	Not determined
<b>Viscosity:</b>	Not determined
<b>Color:</b>	Clear to brown
<b>Odor:</b>	Rotten egg, petroleum like odor

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## 10 – STABILITY AND REACTIVITY

<b>CONDITIONS TO AVOID:</b>	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
<b>CHEMICAL STABILITY:</b>	Stable at 70 °F, 760 mmHg pressure.
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Combustion produces carbon monoxide, aldehydes, aromatics and other hydrocarbons.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur
<b>INCOMPATIBILITY:</b>	Strong oxidizers such as nitrates, chlorates, peroxides.

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## 11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not have a mechanism for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H<sub>2</sub>S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H<sub>2</sub>S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H<sub>2</sub>S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H<sub>2</sub>S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H<sub>2</sub>S, respectively. Over the years a number of acute cases of H<sub>2</sub>S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats sub-chronically exposed to high concentrations of xylenes.

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## 12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

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## 13 – ENVIRONMENTAL INFORMATION

**Spill or Release to the Environment:** Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Place a dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 -1%
n-Hexane	CAS – 110-54-3	Weight % - 0-3%
Benzene	CAS – 71-43-2	Weight % - 0-1%

#### 14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification:           Class B2 Flammable Liquids  
  Class D2B Other Toxic Effects - Skin Irritant  
  Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity:   The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene –        The RQ for benzene is 10 pounds, which equals 3,333 pounds of crude oil (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane –       The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene –         The RQ for toluene is 1000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 2 wt. % toluene.

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#### 15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area "No Smoking or Open Flame". Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of crude oil, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, "Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production," for additional information.

Empty Containers: "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

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#### 16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101): Petroleum Crude Oil  
DOT Hazard Classes (49 CFR 172.101):           3



UN/NA Code (49 CFR 172.101):	UN1267
Packing Group (49 CFR 172.101):	II
Bill of Lading Description (49 CFR 172.202):	Petroleum Crude Oil
DOT Labels Required (49 CFR 172.101):	Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Distillate n.o.s. 1268.

PREPARED BY: Enbridge Pipelines Inc.

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#### Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

#### ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m <sup>3</sup>	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

**Condensate (MSDS)**

# Material Safety Data Sheet



**1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

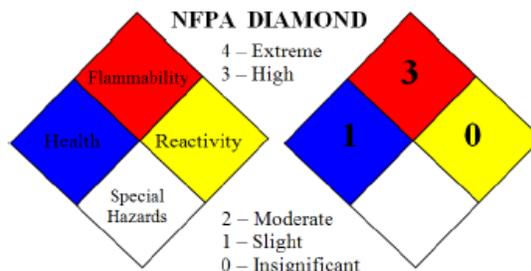
Manufacturer/Supplier: Enbridge Pipelines Inc.  
10201- Jasper Avenue  
Edmonton, Alberta T5J 3N7  
CANADA

Product Name: Condensate  
Synonyms: Petroleum hydrocarbons

General Information: 780-420-5306

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA  
CANUTEC 613-996-6666 Canada

Date Prepared: 09/22/09



**2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS**

Component	CAS Number	Normal % * by Weight	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Natural Gas Condensates/ Light Hydrocarbons of Petroleum	68919-39-1	100	N/A	N/A	N/A
n-Butane	106-97-8	0-10	800	1000	800
n-Hexane	110-54-3	0-10	50	50	50
Benzene	71-43-2	0-5	1	0.5	0.1
Toluene	108-88-3	0-5	100	20	100
Hydrogen sulfide	7783-06-4	< 0.3	20 <sup>Ceiling</sup>	10	10 <sup>Ceiling</sup>
Xylenes	1330-20-7	0-5	100	100	100

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.  
N/A - Not Available

**3 – HAZARDS IDENTIFICATION**

**Flammability:** Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 3

**Stability:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 0

**Potential Health Effects from Overexposure**

*Acute Effects:*

- Ingestion:** Ingestion may result in nausea, vomiting, diarrhea and central nervous system depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.
- Skin Contact:** Prolonged and repeated contact may cause defecting and drying of the skin and can lead to irritation and/or dermatitis.
- Eye Contact:** Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness and swelling. Hydrogen sulfide (H<sub>2</sub>S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.
- Inhalation:** Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract and may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

*Chronic Health Effects from Overexposures:*

Skin and eye irritation. May affect the respiratory and central nervous systems.

*Special Toxic Effects:*

**n-Hexane (CAS 110-54-3)**

**Target Organs** – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

**Toluene (CAS 108-88-3)**

**Target Organs** – Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Sub-chronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system damage in lab animals.

**Developmental** – Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in lab animals.

**Benzene (CAS 71-43-2)**

**Carcinogenicity:** Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

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#### **4 – FIRST AID MEASURES**

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.

**Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.

**Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

**Notes to Physician:** Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

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### 5 – Exposure Controls/ Personal Protection

**Eye Protection:** Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.

**Skin Protection:** The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.

**Respiratory Protection:** A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

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### 6 – FIRE FIGHTING MEASURES

Flash Point:	< 50 °F	Lower Explosive Limit:	Varies, est. 1%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 13%

**Basic Fire Fighting Procedures:** Long-duration fires involving condensate stored in tanks may result in a boil over. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boil over is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

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## 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Clear to brown liquid
<b>Physical Form:</b>	Liquid
<b>Substance type (Pure/Mixture):</b>	Mixture
<b>Boiling Temperature:</b>	<95 to 1000 °F
<b>Melting Temperature:</b>	Not determined
<b>Vapor Pressure:</b>	Not determined
<b>Vapor Density:</b>	Not determined
<b>Evaporation Rate:</b>	(Ethyl ether =1) >1
<b>Specific Gravity:</b>	0.5 - 0.75
<b>Water Solubility:</b>	Negligible
<b>pH:</b>	Not determined
<b>Viscosity:</b>	Not determined
<b>Color:</b>	Clear to brown
<b>Odor:</b>	Rotten egg, petroleum like odor

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## 10 – STABILITY AND REACTIVITY

<b>CONDITIONS TO AVOID:</b>	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
<b>CHEMICAL STABILITY:</b>	Stable at 70 °F, 760 mmHg pressure.
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur
<b>INCOMPATIBILITY:</b>	Strong oxidizers such as nitrates, chlorates, peroxides.

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## 11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H<sub>2</sub>S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H<sub>2</sub>S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can

produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H<sub>2</sub>S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H<sub>2</sub>S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H<sub>2</sub>S, respectively. Over the years a number of acute cases of H<sub>2</sub>S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

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This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats sub-chronically exposed to high concentrations of xylenes.

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## 12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

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## 13 – ENVIRONMENTAL INFORMATION

**Spill or Release to the Environment:** Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 – 5%
n-Hexane	CAS – 110-54-3	Weight % - up to 10%
Benzene	CAS – 71-43-2	Weight % - 0 – 5%

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#### 14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification:           Class B2 Flammable Liquids  
  Class D2B Other Toxic Effects - Skin Irritant  
  Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity: The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene –       The RQ for benzene is 10 pounds, which equals 3,333 pounds of natural gas condensate (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane –     The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene –       The RQ for toluene is 1000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 2 wt. % toluene.

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#### 15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area "No Smoking or Open Flame". Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of natural gas condensate, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, "Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production," for additional information.

Empty Containers: "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

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## 16 – TRANSPORTATION REQUIREMENTS

### General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101): Petroleum Products, n.o.s. (condensate)  
DOT Hazard Classes (49 CFR 172.101): 3  
UN/NA Code (49 CFR 172.101): UN1268  
Packing Group (49 CFR 172.101): I  
Bill of Lading Description (49 CFR 172.202): Petroleum Products, n.o.s. (condensate)  
DOT Labels Required (49 CFR 172.101): Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Crude Oil 1267, Petroleum Distillate n.o.s. 1268, Gasoline UN1203, Flammable liquids, n.o.s. (pentane) UN1993 or Hydrocarbons, Liquid n.o.s. (condensate) UN3295.

PREPARED BY: Enbridge Pipelines Inc.

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### Disclaimer

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### ABBREVIATIONS

ACGIH American Conference of Governmental Industrial Hygienists  
ASTM American Society for Testing and Materials  
CAS Chemical Abstract Service  
CERCLA Comprehensive Environmental Response, Compensation and Liability Act  
CFR Code of Federal Regulations  
HMIS Hazardous Materials Identification System  
IARC International Agency for Research on Cancer



m <sup>3</sup>	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

Diluent (MSDS)

# Material Safety Data Sheet



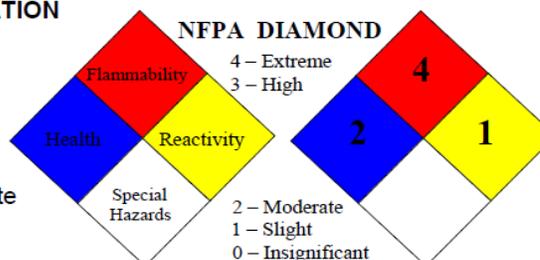
## 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer/Supplier: Enbridge Pipelines Inc.  
10201- Jasper Avenue  
Edmonton, Alberta T5J 3N7  
CANADA

Product Name: Diluent  
Synonyms: Natural Gas Condensate, Gas Well Condensate  
Light Hydrocarbons of Petroleum

General Information: 780-420-5306  
Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA  
CANUTEC 613-996-6666 Canada

Date Prepared: 05/26/2011



## 2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Wt./Vol.	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Natural Gas Condensates/ Light Hydrocarbons of Petroleum	68919-39-1	100	N/A	N/A	N/A
1,2-dimethylcyclopentane	28729-52-4	0.4 - 1.1	None	None	None
2,3-dimethylbutane	79-29-8	0.8 - 1.8	None	500	100
2-methylhexane	591-76-4	1.3 - 1.7	None	None	None
2-methylpentane	107-83-5	5.6 – 9.6	None	500	100
3-methylhexane	589-34-4	1.5 – 1.9	None	None	None
3-methylpentane	96-14-0	3.3 – 5.6	None	500	100
Benzene	71-43-2	1.0 – 1.8	1	0.5	0.1
cyclohexane	110-82-7	1.4 – 3.1	300	100	300
cyclopentane	287-92-3	1.0 – 1.9	N/A	600	600
i-pentane	109-66-0	20.1 – 24.0	1000	600	120
methylcyclohexane	108-87-2	1.2 – 3.2	500	400	400
methylcyclopentane	96-37-7	1.2 – 3.6	None	None	None
n-butane	106-97-8	0.6 – 2.4	800	1000	800
n-heptane	142-82-5	2.3 – 3.2	500	400	85
n-Hexane	110-54-3	7.5 – 10.8	50	50	50

n-Pentane	109-66-0	19.6 – 28.6	600	600	120
Toluene	108-88-3	0.8 – 1.7	100	20	100
Hydrogen sulfide	7783-06-4	≤0.02	20 <sup>Ceiling</sup>	10	10 <sup>Ceiling</sup>
Ethylbenzene	100-41-4	0.1-1	100	100	100
Xylenes	1330-20-7	0-5	100	100	100

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.  
N/A - Not Available

### 3 – HAZARDS IDENTIFICATION

**Flammability:** Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 4

**Stability:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 1

#### Potential Health Effects from Overexposure

*Acute Effects:*

- Ingestion:** Ingestion may result in nausea, vomiting, diarrhea and central nervous system depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.
- Skin Contact:** Prolonged and repeated contact may cause defatting and drying of the skin and can lead to irritation and/or dermatitis.
- Eye Contact:** Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness and swelling. Hydrogen sulfide (H<sub>2</sub>S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.
- Inhalation:** Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract and may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

*Chronic Health Effects from Overexposures:*

Skin and eye irritation. May affect the respiratory and central nervous systems.

*Special Toxic Effects:*

**n-Hexane (CAS 110-54-3)**

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Toluene (CAS 108-88-3)

Target Organs – Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system damage in lab animals.

Developmental – Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in lab animals.

Benzene (CAS 71-43-2)

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

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#### 4 – FIRST AID MEASURES

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanse. If irritation or redness develops, seek medical attention.
- Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

**Notes to Physician:** Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

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#### 5 – Exposure Controls/ Personal Protection

- Eye Protection:** Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.
- Skin Protection:** The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.
- Respiratory Protection:** A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators

may not provide adequate protection. A respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

## 6 – FIRE FIGHTING MEASURES

Flash Point:	< 22 °F	Lower Explosive Limit:	Varies, est. 0.8%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 6%

**Basic Fire Fighting Procedures:** Long-duration fires involving diluent stored in tanks may result in a boilover. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boilover is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

**Extinguishing Media:** Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO<sub>2</sub>, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

**Unusual Fire and Explosion Hazards:** This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

## 7 – ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

**Spill management:** Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dike and contain land spills; contain water spills by booming. For large spills remove by mechanical

means such as vacuuming or pumping and place in containers. All equipment used when handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

Reporting: Report spills to local or federal authorities as appropriate or required.

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## 8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Stores in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H<sub>2</sub>S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before unloading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

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## 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Clear to brown liquid
<b>Physical Form:</b>	Liquid
<b>Substance type (Pure/Mixture):</b>	Mixture
<b>Boiling Temperature:</b>	-127 to 1000 °F
<b>Melting Temperature:</b>	Not determined
<b>Vapor Pressure:</b>	about 12 psi
<b>Vapor Density:</b>	1.0 - 3.9
<b>Evaporation Rate:</b>	(Ethyl ether =1) >1
<b>Specific Gravity:</b>	0.6 – 0.7
<b>Water Solubility:</b>	Negligible
<b>pH:</b>	Not determined
<b>Viscosity:</b>	Not determined
<b>Color:</b>	Clear to brown
<b>Odor:</b>	Rotten egg, petroleum like odor

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## 10 – STABILITY AND REACTIVITY

<b>CONDITIONS TO AVOID:</b>	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
<b>CHEMICAL STABILITY:</b>	Stable at 70 °F, 760 mmHg pressure.
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur

INCOMPATIBILITY: Strong oxidizers such as nitrates, chlorates, peroxides.

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## 11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific, sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H<sub>2</sub>S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H<sub>2</sub>S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H<sub>2</sub>S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H<sub>2</sub>S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H<sub>2</sub>S, respectively. Over the years a number of acute cases of H<sub>2</sub>S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats subchronically exposed to high concentrations of xylenes.

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## 12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with

state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

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### 13 – ENVIRONMENTAL INFORMATION

**Spill or Release to the Environment:** Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as condition warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of a spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

SARA Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 – 2%
n-Hexane	CAS – 110-54-3	Weight % - up to 11%
Benzene	CAS – 71-43-2	Weight % - 0 – 2%

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### 14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification:            Class B2 Flammable Liquids  
    Class D2B Other Toxic Effects - Skin Irritant  
    Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity:    The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene –            The RQ for benzene is 10 pounds, which equals 3,333 pounds of natural gas condensate (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane –          The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene – The RQ for toluene is 1000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 2 wt. % toluene.

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## 15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area "No Smoking or Open Flame". Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of natural gas condensate, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, "Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production," for additional information.

Empty Containers: "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

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## 16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101):	Petroleum Products, n.o.s. (condensate)
DOT Hazard Classes (49 CFR 172.101):	3
UN/NA Code (49 CFR 172.101):	UN1268
Packing Group (49 CFR 172.101):	II
Bill of Lading Description (49 CFR 172.202):	Petroleum Products, n.o.s. (condensate)
DOT Labels Required (49 CFR 172.101):	Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Crude Oil 1267, Petroleum Distillate n.o.s. 1268, Gasoline UN1203, Flammable liquids, n.o.s. (pentane) UN1993 or Hydrocarbons, Liquid n.o.s. (condensate) UN3295.

PREPARED BY: Enbridge Pipelines Inc.

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### Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the

Natural Gas (MSDS)

# Material Safety Data Sheet



## 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

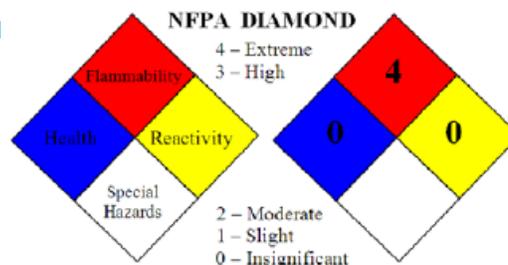
Manufacturer/Supplier: Vector Pipeline/Enbridge Pipelines Inc.  
10201- Jasper Avenue  
Edmonton, Alberta T5J 3N7  
CANADA

Product Name: Pipeline Quality Natural Gas  
Synonyms: Compressed Natural Gas

General Information: 780-420-5306

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA  
CANUTEC 613-996-6666 Canada

Date Prepared: 09/22/09



## 2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Weight	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Methane	74-82-8	95-98	N/A	1000**	N/A
Ethane	74-84-0	<3%	N/A	1000	N/A
Propane	74-98-6	<3%	N/A	1000	N/A
Carbon dioxide	124-38-9	< 3.0	5000	5000	5000
Nitrogen	7727-37-9	< 2.0	Simple asphyxiant	Simple asphyxiant	Simple asphyxiant
Total sulfur	N/A	< 300 ppm	N/A	N/A	N/A
Hydrogen sulfide	7783-06-4	< 4 ppm	20 <sup>Ceiling</sup>	10	10 <sup>Ceiling</sup>

\* Values do not reflect absolute minimums and maximums; those values may vary from time to time.

N/A - Not Available

\*\* ACGIH TLV for aliphatic hydrocarbon gases alkane [C1-C4], not specifically developed for methane

## 3 – HAZARDS IDENTIFICATION

**Flammability:** Flammable gases and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).  
HMIS Classification for Flammability: 4

**Stability:** Stable under normal conditions. Avoid all sources of ignition.  
HMIS Classification for Reactivity: 0

**DANGER!** Flammable high-pressure gas. Can form explosive mixtures with air. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers.

### Potential Health Effects from Overexposure

*Acute Effects:*

- Ingestion: An unlikely route of exposure.
- Skin Contact: No harm expected.
- Eye Contact: No harm expected. Pressurized gas may cause mechanical injury to the eyes.
- Inhalation: Natural gas can act as a simple asphyxiant by displacing oxygen. Asphyxiation symptoms include headaches, rapid respiration, nausea, CNS depression, disorientation, unconsciousness, coma and death.

*Chronic Health Effects from Overexposures:*

Might affect the respiratory and central nervous systems under extremely high concentrations. No harm effects expected otherwise. None reported with respect to carcinogenicity, mutagenicity, reproductive toxicity, and teratogenicity.

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### 4 – FIRST AID MEASURES

- Ingestion: This material is a gas under normal atmospheric conditions and ingestion is unlikely.
- Skin Contact: Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water.
- Eye Contact: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation: If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

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### 5 – Exposure Controls/ Personal Protection

- Eye Protection: Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.
- Skin Protection: Chemical resistant gloves are not needed for handling natural gas. They are not required based on the hazards of the material. However, it is considered good practice to wear gloves when handling chemicals. Flame retardant clothing should be worn in potentially flammable areas.
- Respiratory Protection: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits and a flammable atmosphere does not exist. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A

respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

Engineering Controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits and the lower explosive limit, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

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## 6 – FIRE FIGHTING MEASURES

Flash Point:	-80 °F	Lower Explosive Limit:	Varies, est. 3%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 17%

*Basic Fire Fighting Procedures:* Evacuate all personnel from danger area. Stop spill/release if it can be done with minimal risk. Remove ignition sources if without risk. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. For large leaks nonessential personnel should be evacuated beyond 750 meters.

*Extinguishing Media:* Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO<sub>2</sub> and dry chemicals. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

*Unusual Fire and Explosion Hazards:* This material is highly flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. For large leaks nonessential personnel should be evacuated beyond 750 meters.

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## 7 – ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Leak management: Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Ventilate the area. All equipment used when handling the product must be grounded.

Reporting: Report leaks (greenhouse gases) to local or federal authorities as appropriate or required.

## 8 – HANDLING AND STORAGE

Handling: Do not cut, puncture or weld on containers without appropriate procedures. Ground and bond all lines and equipment. Keep away from heat, sparks, open flames and other sources of ignition. Rapid escape of gas may generate static charge. Use of explosion proof electrical equipment is required. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently.

Storage: Keep containers tightly closed and store in a cool, well ventilated area away from heat, incompatibles, sparks, open flames and other sources of ignition. Outside storage is preferred. All containers should be inspected for leakage on a regular basis. Ground all equipment containing materials. Contents are under pressure. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Post area "No Smoking or Open Flame." Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

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## 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Colorless gas
<b>Physical Form:</b>	Liquid
<b>Substance type (Pure/Mixture):</b>	Mixture
<b>Boiling Temperature:</b>	-259 °F/-161°C (as methane)
<b>Melting Temperature:</b>	N/A
<b>Vapor Pressure:</b>	Not determined
<b>Vapor Density:</b>	0.53 - 0.7 (as methane)
<b>Evaporation Rate:</b>	(Ethyl ether =1) >1
<b>Specific Gravity:</b>	0.55
<b>Water Solubility:</b>	Negligible
<b>pH:</b>	Not determined
<b>Viscosity:</b>	Not determined
<b>Color:</b>	Colorless
<b>Odor:</b>	Slight hydrocarbon odor not detectable by all people

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## 10 – STABILITY AND REACTIVITY

<b>CONDITIONS TO AVOID:</b>	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
<b>CHEMICAL STABILITY:</b>	Stable
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b>	Combustion produces carbon monoxide and carbon dioxide.
<b>HAZARDOUS POLYMERIZATION:</b>	Will not occur
<b>INCOMPATIBILITY:</b>	Strong oxidizers such as nitrates, chlorates, and peroxides, halogens, acids

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## 11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

LD50: Not applicable

LC50: Not applicable

CARCINOGENICITY: None of the components of natural gas is listed by NTP, OSHA, or IARC.

Target Organs: Central nervous system depression and cardiac sensitization.

Developmental: No data available for this material.

Other Comments: High concentrations may reduce the amount of oxygen available for breathing, especially in confined spaces. Hypoxia (inadequate oxygen) during pregnancy may have adverse effects on

the developing fetus. Exposure during pregnancy to high concentrations of carbon monoxide or carbon dioxide, which are produced during the combustion of hydrocarbon gases, can also cause harm to the developing fetus. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Pre-Existing Medical Conditions: Exposure to high concentrations of Natural Gas may increase the sensitivity of the heart to certain drugs. Persons with pre-existing heart disorders may be more susceptible to this effect.

General: Simple asphyxiant toxicity is based on availability of oxygen. Asphyxiation symptoms include headaches, rapid respiration, nausea, CNS depression, disorientation, unconsciousness, coma and death. The minimal oxygen content in air should be 18% under normal atmospheric condition (equivalent to a partial pressure (PO<sub>2</sub>) of 135 mm of Hg). In a study conducted in 1948, dogs breathed varying mixtures of hydrocarbons and oxygen for 10 minutes. Dogs exposed to butane, ethane, and propane, minor components of this mixture, showed varying degrees of myocardial sensitivity to injected epinephrine hydrochloride as determined by electrocardiogram (EKG) readings. No direct evidence is known of cardiac sensitization in humans induced by any of these components.

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## 12 – DISPOSAL INFORMATION

If permissible under applicable federal, provincial/state and municipal requirements, allow complete dissipation of natural gas. Vent gas to a safe location, preferably by burning in a flare. If gas cannot be flared, special care must be taken to ensure complete dissipation of the gas to a concentration below its flammable limits.

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## 13 – ENVIRONMENTAL INFORMATION

There is no information available on the ecotoxicological effects of petroleum gases. Because of their high volatility, they are unlikely to cause ground or water pollution. Petroleum gases released into the environment will rapidly disperse into the atmosphere and undergo photochemical degradation.

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## 14 – REGULATORY INFORMATION

USA: SARA: Title III, Sections 302, 304, 311, 312, and 313.

TSCA: None

Department of Transportation: Office of Pipeline Safety, CFR Title 49, Parts 191-192, with all revisions.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL).

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

WHMIS Classification: Class A – Compressed Gas; Class B-1 Flammable Gas

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## 15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Flame-retardant clothing, including leather or cotton gauntlet gloves, must be worn in any situation where pressurized natural gas may ignite accidentally.

Wear goggles or a face shield when working with any pressurized gases.

Use an explosion-proof oxygen [O<sub>2</sub>] tester, NOT a combustible-gas detector, to check the atmosphere of any area that may be deficient in oxygen. If the oxygen reading is below 19.5%, use a SUPPLIED-AIR RESPIRATOR with a properly fitting face mask. Use the same type of respirator in trenches over four feet deep when a gas-air mix exists below the gas line. Using only a cartridge respirator in low-oxygen conditions may lead to asphyxiation.

Ground all equipment and houselines used in natural gas service to prevent the buildup of static and possible sparks. Where feasible, use non-sparking tools to work on and around natural gas lines and equipment.

Natural gas may be present in mains, services, houselines, or customers' equipment at pressures ranging from less than 1 psi to over 720 psi. Open and close gas valves slowly to avoid pressure surges that might cause personal injury or damage equipment.

Provide sufficient local exhaust to prevent gas buildup to 20% of LEL. Pressure-test natural gas houselines with inert gas before putting them into service for the first time, and again when taking them permanently out of service.

At least 48 hours prior to excavating in an area where gas lines are known or suspected to be, call before you dig. Many communities have a one-call service that alerts all underground utilities (gas, power, telephone, TV cable, water, or sewer) to mark their lines. Check your telephone book for the local number. If a gas line is damaged, IMMEDIATELY report the incident to Vector/Enbridge Pipelines Inc. If the gas line is broken, evacuate the area and also call the local fire department. If a gas line has been bent or pulled out of alignment, other gas lines in the vicinity may have been damaged even if the pulled line looks intact. If only the gas line's coating is damaged, it must still be inspected and properly repaired by the gas company before reburial, to prevent corrosion and possible leakage.

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## 16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101):	Flammable gas
DOT Hazard Classes (49 CFR 172.101):	2.1
UN/NA Code (49 CFR 172.101):	UN1971
Packing Group (49 CFR 172.101):	N/A
Bill of Lading Description (49 CFR 172.202):	Flammable gas
DOT Labels Required (49 CFR 172.101):	Flammable gas

PREPARED BY: Enbridge Pipelines Inc.

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### Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

### ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m <sup>3</sup>	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

## Natural Gas Liquid (MSDS)

## Material Safety Data Sheet

**1. Product and company identification**

<b>Product name</b>	NATURAL GAS LIQUIDS, NGL MIX This material can contain hydrogen sulfide (H <sub>2</sub> S), a very toxic and extremely flammable gas.
<b>MSDS #</b>	0000001535
<b>Historic MSDS #:</b>	08705
<b>Code</b>	0000001535
<b>Product use</b>	Fuel.
<b>Supplier</b>	BP Energy Company 501 WestLake Park Boulevard Houston, TX 77079 USA
<b>EMERGENCY HEALTH INFORMATION:</b>	1 (800) 447-8735 Outside the US: +1 703-527-3887 (CHEMTREC)
<b>EMERGENCY SPILL INFORMATION:</b>	1 (800) 424-9300 CHEMTREC (USA)
<b>OTHER PRODUCT INFORMATION</b>	1 (866) 4 BP - MSDS (866-427-8737 Toll Free - North America) email: <a href="mailto:bpcares@bp.com">bpcares@bp.com</a>

**2. Hazards identification**

<b>Physical state</b>	Gas. [Liquefied gas]
<b>Color</b>	Clear. Colorless.
<b>Emergency overview</b>	<b>DANGER !</b>  EXTREMELY FLAMMABLE GAS. MAY CAUSE FLASH FIRE. AT VERY HIGH CONCENTRATIONS, CAN DISPLACE THE NORMAL AIR AND CAUSE SUFFOCATION FROM LACK OF OXYGEN. INHALATION CAUSES HEADACHES, DIZZINESS, DROWSINESS AND NAUSEA AND MAY LEAD TO UNCONSCIOUSNESS. VAPOR MAY CONTAIN HYDROGEN SULFIDE (H <sub>2</sub> S) GAS WHICH CAN BE HARMFUL OR FATAL IF INHALED. CONTAINS BENZENE. CANCER HAZARD. CAN CAUSE BLOOD DISORDERS. HARMFUL IF ABSORBED THROUGH SKIN.  Contact with rapidly expanding gas may cause burns or frostbite.  Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Harmful in contact with skin. Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis. At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not enter storage areas and confined spaces unless adequately ventilated. Avoid exposure - obtain special instructions before use. Do not breathe gas. Do not get in eyes. Avoid contact with skin and clothing. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
<b>Routes of entry</b>	Dermal contact. Eye contact. Inhalation.

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	<b>(US-COMP)</b>	<b>Language</b> ENGLISH. <b>(ENGLISH)</b>

**Potential health effects**

- Eyes** Contact with rapidly expanding gas may cause burns or frostbite. Will cause serious damage to the eyes.
- Skin** Contact with rapidly expanding gas may cause burns or frostbite. Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis. Contains Benzene. Cancer hazard. Can cause cancer. Can cause blood disorders. Harmful if absorbed through the skin.
- Inhalation** May be harmful or fatal if inhaled. At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. Inhalation causes headaches, dizziness, drowsiness and nausea and may lead to unconsciousness. This material can contain hydrogen sulfide (H<sub>2</sub>S), a very toxic and extremely flammable gas. Contains Benzene. Cancer hazard. Can cause cancer. Can cause blood disorders.
- Ingestion** Not applicable (gas).

See toxicological information (section 11)

**3. Composition/information on ingredients**

Ingredient name	CAS #	%
Natural gas (petroleum) raw liq. mix	64741-48-6	100
Contains:		
Benzene	71-43-2	0.1 - 5
Hydrogen Sulfide	7783-06-4	0 - 0.1

**4. First aid measures**

- Eye contact** Contact with liquid: Immediately flush with plenty of tepid water (105-115 F; 41-46 C). DO NOT USE HOT WATER. Get immediate medical attention.
- Skin contact** Contact with liquid: Immediately flush with plenty of tepid water (105-115 F; 41-46 C). DO NOT USE HOT WATER. Get immediate medical attention.
- Inhalation** If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
- Ingestion** As this product is a gas, refer to the inhalation section.

**5. Fire-fighting measures**

- Flammability of the product** Extremely flammable gas.
- Flash point** Open cup: <-40°C (<-40°F)
- Explosion limits** Lower: 1.1%  
Upper: 15%
- Fire/explosion hazards** Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
- Unusual fire/explosion hazards** Extremely explosive in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
- Extinguishing media**
  - Suitable** Use an extinguishing agent suitable for the surrounding fire.
  - Not suitable** Do not use water jet.
- Fire-fighting procedures** 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.

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<b>Hazardous combustion products</b>	Combustion products may include the following: Hydrogen Sulfide (H <sub>2</sub> S), sulfur oxides (SO <sub>2</sub> , SO <sub>3</sub> etc.), carbon oxides (CO, CO <sub>2</sub> ) (carbon monoxide, carbon dioxide)
<b>Protective clothing (fire)</b>	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

<b>Environmental precautions</b>	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).
<b>Personal protection in case of a large spill</b>	Chemical splash goggles. Chemical-resistant protective suit. Boots. Chemical-resistant gloves. Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Suggested protective clothing might not be adequate. Consult a specialist before handling this product. CAUTION: The protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of air-purifying respirator.
<b>Methods for cleaning up</b>	
<b>Large spill</b>	Immediately contact emergency personnel. Eliminate all ignition sources. 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.
<b>Small spill</b>	Immediately contact emergency personnel. Eliminate all ignition sources. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

## 7. Handling and storage

<b>Handling</b>	Put on appropriate personal protective equipment (see section 8). Workers should wash hands and face before eating, drinking and smoking. 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. High pressure gas.
<b>Storage</b>	Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.
<b>Other information</b>	Vapors containing hydrogen sulfide may accumulate during storage or transport and may also be vented during filling of tanks. Hydrogen sulfide has a typical "bad egg" smell but at high concentrations the sense of smell is rapidly lost, therefore do not rely on sense of smell for detecting hydrogen sulfide. Use specially designed measuring instruments for determining its concentration.

## 8. Exposure controls/personal protection

### Occupational exposure limits

Ingredient name	Occupational exposure limits
Natural gas (petroleum) raw liq. mix	<b>ACGIH TLV (United States).</b> : 1 ppm Form: Simple asphyxiant.
Benzene	<b>ACGIH TLV (United States). Absorbed through skin.</b> STEL: 8 mg/m <sup>3</sup> 15 minute(s). Issued/Revised: 5/1997 STEL: 2.5 ppm 15 minute(s). Issued/Revised: 5/1997 TWA: 1.6 mg/m <sup>3</sup> 8 hour(s). Issued/Revised: 5/1997 TWA: 0.5 ppm 8 hour(s). Issued/Revised: 5/1997 <b>NIOSH REL (United States).</b> STEL: 1 ppm 15 minute(s). Issued/Revised: 6/1994 TWA: 0.1 ppm 10 hour(s). Issued/Revised: 6/1994 <b>OSHA PEL (United States).</b> STEL: 5 ppm 15 minute(s). Issued/Revised: 6/1993 TWA: 1 ppm 8 hour(s). Issued/Revised: 6/1993 <b>OSHA PEL Z2 (United States).</b>

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**Hydrogen Sulfide**

AMP: 50 ppm 10 minute(s). Issued/Revised: 6/1993  
 CEIL: 25 ppm Issued/Revised: 6/1993  
 TWA: 10 ppm 8 hour(s). Issued/Revised: 6/1993  
**ACGIH TLV (United States).**  
 STEL: 21 mg/m<sup>3</sup> 15 minute(s). Issued/Revised: 9/1994  
 STEL: 15 ppm 15 minute(s). Issued/Revised: 9/1994  
 TWA: 14 mg/m<sup>3</sup> 8 hour(s). Issued/Revised: 9/1994  
 TWA: 10 ppm 8 hour(s). Issued/Revised: 9/1994  
**NIOSH REL (United States).**  
 CEIL: 15 mg/m<sup>3</sup> 10 minute(s). Issued/Revised: 6/1994  
 CEIL: 10 ppm 10 minute(s). Issued/Revised: 6/1994  
**OSHA PEL Z2 (United States).**  
 AMP: 50 ppm 10 minute(s). Issued/Revised: 6/1993  
 CEIL: 20 ppm Issued/Revised: 6/1993

While specific OELs for certain components may be shown in this section, other components may be present in any mist, vapor or dust produced. Therefore, the specific OELs may not be applicable to the product as a whole and are provided for guidance only.

Some states may enforce more stringent exposure limits.

**Control 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.

**Personal protection**

**Eyes** Avoid contact with eyes. Wear chemical goggles and a full face shield

**Skin and body** Avoid contact with skin and clothing. Protective/insulated gloves.

**Respiratory** Use adequate ventilation. The gas can cause asphyxiation without warning by replacing the oxygen in the air. Air-filtering respirators, also called air-purifying respirators, will not be adequate under conditions of oxygen deficiency (i.e. low oxygen concentration), and would not be considered suitable where airborne concentrations of chemicals with a significant hazard are present. In these cases air-supplied breathing apparatus will be required. Approved air-supplied breathing apparatus must be worn where there is a risk of inhaling hydrogen sulfide gas and / or there is a risk of oxygen deficiency (i.e. low oxygen concentration). Personal gas monitors may also provide early warning of hydrogen sulfide. If operating conditions cause high vapor concentrations or the TLV is exceeded, use supplied-air respirator.

**Hands** Insulated gloves suitable for low temperatures

The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Consult your supervisor or S.O.P. for special handling instructions.

**9. Physical and chemical properties**

**Physical state** Liquefied gas  
**Color** Clear. Colorless.  
**Odor** Natural Gas Odor  
**Flash point** Open cup: <-40°C (<-40°F)  
**Explosion limits** Lower: 1.1%  
 Upper: 15%  
**Boiling point / Range** -96 to 170°C (-140.8 to 338°F)

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Vapor density 1 to 3 [Air = 1]  
Solubility insoluble in water.

## 10. Stability and reactivity

**Stability and reactivity** The product is stable.

**Possibility of hazardous reactions** Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid** Avoid all possible sources of ignition (spark or flame). Keep away from heat and direct sunlight. Hot containers may explode.

**Incompatibility with various substances** Highly reactive or incompatible with the following materials: oxidizing materials, halogenated compounds

**Hazardous decomposition products** Products of combustion: Hydrogen Sulfide (H<sub>2</sub>S), sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub> etc.), carbon oxides (CO, CO<sub>2</sub>) (carbon monoxide, carbon dioxide)

**Hazardous polymerization** Under normal conditions of storage and use, hazardous polymerization will not occur.

## 11. Toxicological information

### Acute toxicity

#### Classification

Product/ingredient name	IARC	NTP	OSHA
Benzene	1	Proven.	+

IARC :  
1 - Carcinogenic to human.

NTP :  
Proven - Known to be human carcinogens.

OSHA :  
+ Potential occupational carcinogen

#### Other information

This material is an asphyxiant. Asphyxiants may reduce the oxygen concentration in the air to dangerous levels. Symptoms of lack of oxygen include increased depth and frequency of breathing, air hunger, dizziness, headache, nausea or loss of consciousness.

High vapor concentrations can cause headaches, dizziness, drowsiness and nausea and may lead to unconsciousness. Exposure to vapor at high concentrations may have the following effects: heart beat irregularity (arrhythmia)

Hydrogen sulfide (H<sub>2</sub>S) gas may accumulate in storage tanks of bulk transport compartments containing this material. Contact with eyes causes painful conjunctivitis, sensitivity to light, tearing and clouding of vision. Inhalation of low concentrations causes a runny nose with a loss of sense of smell, labored breathing and shortness of breath. Direct contact with skin causes pain and redness. Other symptoms of exposure include profuse salivation, nausea, vomiting, diarrhea, giddiness, headache, dizziness, confusion, rapid breathing, rapid heart rate, sweating, weakness, sudden collapse, unconsciousness and death due to respiratory paralysis.

Cardiac neurological effects have also been reported. Prolonged breathing (greater than one hour) of concentrations of H<sub>2</sub>S around 50 ppm can produce eye and respiratory tract irritation. Levels of 250 to 600 ppm will result in fluid in the lungs, and concentrations around 1,000 ppm will cause unconsciousness and death in a short period of time. Since the sense of smell rapidly becomes insensitive to this toxic, colorless gas, odor cannot be relied upon as an indicator of concentrations of the gas. Always exercise caution when working around closed containers.

Benzene: Acute toxicity of benzene results primarily from depression of the central nervous system (CNS). Inhalation of concentrations over 50 ppm can produce headache, lassitude, weariness, dizziness, drowsiness, or excitation. Exposure to very high levels can result in unconsciousness and death.

Benzene: Long-term overexposure to benzene has been associated with certain types of leukemia

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in humans. In addition, the International Agency for Research on Cancer (IARC), the National Toxicology Program, and OSHA consider benzene to be a human carcinogen. Chronic exposures to high levels of benzene have been reported to cause adverse blood effects including anemia. Benzene exposure can occur by inhalation and absorption through the skin. Inhalation and forced feeding studies of benzene in laboratory animals have produced a carcinogenic response in a variety of organs, including possibly leukemia, other adverse effects on the blood, chromosomal changes and some effects on the immune system. Exposure to benzene at levels up to 300 ppm did not produce birth defects in animal studies; however, exposure to higher dosage levels resulted in a reduction of body weight of the rat pups (fetotoxicity). Changes in the testes have been observed in mice exposed to benzene at 300 ppm, but reproductive performance was not altered in rats exposed to benzene at the same level. Aspiration of this material into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this material.

**Potential chronic health effects**

**Carcinogenicity** Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

## 12. Ecological information

No testing has been performed by the manufacturer.

**Mobility** This product is not likely to move rapidly with surface or groundwater flows because of its low water solubility of: <0.1%

## 13. Disposal considerations

**Waste information** The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. 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. Do not puncture or incinerate container. Empty pressure vessels should be returned to the supplier.

**NOTE:** The generator of waste has the responsibility for proper waste identification (based on characteristic(s) or listing), transportation and disposal

## 14. Transport information

**International transport regulations**

Regulatory information	UN number	Proper shipping name	Class	Packing group	Additional information
<b>DOT Classification</b>	UN1075	Liquefied petroleum gas (Benzene)	2.1	-	-
<b>TDG Classification</b>	UN1267	PETROLEUM CRUDE OIL (Benzene)	2.1	-	-
<b>IMDG Classification</b>	UN1075	Liquefied petroleum gas (Benzene)	2.1	-	-
<b>IATA/ICAO Classification</b>	UN1075	Liquefied petroleum gas (Benzene)	2.1	-	-

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## 15. Regulatory information

### U.S. Federal Regulations

**United States inventory (TSCA 8b)**

All components are listed or exempted.

**SARA 302/304/311/312 extremely hazardous substances:** No products were found.

**SARA 302/304 emergency planning and notification:** No products were found.

**SARA 302/304/311/312 hazardous chemicals:** Benzene

**SARA 311/312 MSDS distribution - chemical inventory - hazard identification:** NATURAL GAS LIQUIDS, NGL MIX: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

### SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Benzene	71-43-2	0.1 - 5
Supplier notification	Benzene	71-43-2	0.1 - 5
CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4):	CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.54 kg); Hydrogen Sulfide: 100 lbs. (45.4 kg);		

### State regulations

**Massachusetts Substances**

The following components are listed: BENZENE

**New Jersey Hazardous Substances**

The following components are listed: BENZENE

**Pennsylvania RTK Hazardous Substances**

The following components are listed: BENZENE

**California Prop. 65**

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.  
Benzene

### Inventories

**Canada inventory**

All components are listed or exempted.

**Europe inventory**

All components are listed or exempted.

**Australia inventory (AICS)**

All components are listed or exempted.

**China inventory (IECSC)**

Not determined.

**Japan inventory (ENCS)**

Not determined.

**Korea inventory (KECI)**

All components are listed or exempted.

**Philippines inventory (PICCS)**

Not determined.

## 16. Other information

### Label requirements

DANGER !

EXTREMELY FLAMMABLE GAS.  
MAY CAUSE FLASH FIRE.  
AT VERY HIGH CONCENTRATIONS, CAN DISPLACE THE NORMAL AIR AND CAUSE SUFFOCATION FROM LACK OF OXYGEN.  
INHALATION CAUSES HEADACHES, DIZZINESS, DROWSINESS AND NAUSEA AND MAY LEAD TO UNCONSCIOUSNESS.  
VAPOR MAY CONTAIN HYDROGEN SULFIDE (H<sub>2</sub>S) GAS WHICH CAN BE HARMFUL OR FATAL IF INHALED.  
CONTAINS BENZENE. CANCER HAZARD.  
CAN CAUSE BLOOD DISORDERS.

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HARMFUL IF ABSORBED THROUGH SKIN.

Contact with rapidly expanding gas may cause burns or frostbite.

**HMIS® Rating :**

Health \* 3  
Flammability 4  
Physical Hazard 0  
Personal protection X

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



**History**

Date of issue 07/22/2009.  
Date of previous issue 08/07/2006.  
Prepared by Product Stewardship

**Notice to reader**

*NOTICE : This Material Safety Data Sheet is based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We are not responsible for any damage or injury resulting from abnormal use, from any failure to follow appropriate practices or from hazards inherent in the nature of the product.*

## 6.10 Forms

The following forms should be used, when applicable, in the initial phases of an emergency response.

### 6.10.1 Company Forms

- Form A – Receiving Emergency Information
- Form B – Warning Information
- Form C – Initial Response Checklist
- In-Situ Burn Plan Template

### 6.10.2 Industry Forms

- National Response Center Questions
- Weather Report
- ICS 201-1 Incident Briefing Map/Sketch
- ICS 201-2 Summary of Current Actions
- ICS 201-3 Current Organization
- ICS 201-4 Resource Summary
- ICS 201-5 Site Safety and Control Analysis
- ICS 208 Site Safety Plan
- ICS 214a Individual Log

### 6.10.1 Company Forms



## FORM A

---

### RECEIVING EMERGENCY INFORMATION (Page 1 of 2)

To be used by any employee receiving an emergency notification or in preparation for attending the emergency location as an early responder.

#### 1. NOTIFICATION

Date and Time of Notification:

Name of Employee Receiving Call:

#### 2. CALLER

Name of Person Reporting:

Caller's Location:

Caller's Telephone # (next 2 hours): (Home):

Caller's Address:

#### 3. EMERGENCY DESCRIPTION

Condition Observed (spill, cloud, odor, etc.):

Facility Involved, Location or Land Description:

Date and Time Incident Observed:

Nearest City or Village:

Local Directions to Site:

Nearest River, Stream, Lake (direction & distance):

Other Helpful Information (weather, wind, roads, public, injuries):

---

October 2012



**FORM A**

**RECEIVING EMERGENCY INFORMATION (Page 2 of 2)**

**4. EMERGENCY REPORTING**

Did Caller Notify Police or Other Agencies? When?

Are Other Emergency Response Agencies On Site or En-route? Provide Details:

**5. INTERNAL REPORTING**

If this is a potential emergency and you are the first Enbridge point-of-contact, call the Edmonton Control Centre (ECC) at:

Canada: 1-877-420-8800

North Dakota: 1-888-838-4545

All Other US: 1-800-858-5253

Time ECC Notified:

Name of Notifier:

ECC Contact:

Line Shutdown Requested?

Line Shutdown Time:

General Manager or Designate Notified:

Time:

Name:

Area Supervisor or Designate Notified:

Time:

Name:

Other Internal Notifications:

**6. OTHER INFORMATION**

**Give Warning Information for NGL/Crude oil if appropriate  
(see Warning Information Form)**

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FORM B

**WARNING INFORMATION**

To be provided as necessary to co-operative Emergency Responders, such as local police or fire-fighters or as otherwise required.

**INCIDENT FOLLOWUP CALLING GUIDE TO POLICE**

“This is Enbridge Pipelines (*Superior, Chicago, Cushing, or North Dakota*) Inc. calling from \_\_\_\_\_.  
Our telephone number is \_\_\_\_\_.

We have received a report of a smell of gas or crude oil vapor or a small leak from location (i.e., land description, station, etc.).

We have dispatched Company personnel to confirm the report. We are not requesting your assistance at this time. We will provide you with more factual information when it becomes available and confirm if your assistance is required.”

Give following warning information for NGL/Crude oil.

**WARNING INFORMATION FOR NGL INCIDENT (POLICE)**

Natural gas liquids are mixtures of hydrocarbons – the major component is propane.

Vapors will usually appear as a white cloud. They are extremely flammable and will collect in low lying areas.

Approach pipeline leaks using extreme caution.

Keep all ignition sources and vehicles away from leak and vapor cloud.

**WARNING INFORMATION FOR CRUDE OIL INCIDENT (POLICE)**

Crude oil is flammable and toxic.

Vapors collect in low areas.

Approach pipeline leaks using extreme caution.

Keep all ignition sources and vehicles away from leak.

October 2012



**FORM C**

**Requirements**

When exploring a suspected or reported emergency, safe work practices will be followed per the following guidelines:

Initial Response Checklist	
<b>The order of these actions will depend on the situation</b>	
<b>EXPLORE-</b> To be reviewed by the First Responder prior to taking any immediate action.	
<input type="checkbox"/>	Determine the wind direction and approach cautiously from upwind.
<input type="checkbox"/>	Explore the suspected release area only when wearing appropriate PPE using the buddy system if possible.
<input type="checkbox"/>	Ensure safety of personnel in the area.
<input type="checkbox"/>	Conduct a hazard assessment to determine the potential for fire, explosion and hazardous toxic vapors.
<input type="checkbox"/>	Eliminate or shut off all potential ignition sources in the immediate area
<input type="checkbox"/>	Use intrinsically safe equipment (e.g., flashlights, two-way radios, gas detectors with audible alarms)
<input type="checkbox"/>	Maintain regular/scheduled communication with the Control Centre and Regional Management/on-call person.
<b>APPROACH</b>	
<input type="checkbox"/>	Verify wind direction and stay upwind.
<input type="checkbox"/>	Are people injured or trapped?
<input type="checkbox"/>	Are there outside people involved in rescue or evacuation?
	Are there immediate signs of potential hazards such as:
<input type="checkbox"/>	Electrical lines down or overhead?
<input type="checkbox"/>	Unidentified liquid or solid products visible?
<input type="checkbox"/>	Vapors visible?
<input type="checkbox"/>	Smells or breathing hazards evident?
<input type="checkbox"/>	Fires, sparks or ignition sources visible?
<input type="checkbox"/>	Holes, caverns, deep ditches, fast water or cliffs nearby?
<input type="checkbox"/>	Is local traffic a potential problem?
<input type="checkbox"/>	Ground conditions (circle one) <b>Dry</b> <b>Wet</b> <b>Icy</b>
<b>CONFIRM &amp; CONTROL</b>	
<input type="checkbox"/>	Confirm identification of spilled material and check the MSDS sheets.
<input type="checkbox"/>	Assess the spill threat, site safety, and parameters such as spill volume, extent and direction of movement.
<input type="checkbox"/>	Has pipeline(s) been shut down?
<input type="checkbox"/>	If on water, consult Control Point and HCA maps for appropriate response strategies for incoming resources.
<input type="checkbox"/>	Has wind direction been confirmed and windsock erected?
<input type="checkbox"/>	Has the public been protected or evacuation considered if necessary?
<input type="checkbox"/>	Have all ignition sources been identified and eliminated?
<input type="checkbox"/>	Establish Exclusion zone and Safe Work Areas.
<input type="checkbox"/>	Have personal protection & safety requirements been established and communicated?



**FORM C**

<input type="checkbox"/>	Is adequate fire protection equipment available and in place?
<input type="checkbox"/>	Have valves been locked out if necessary?
<input type="checkbox"/>	Are tank and VAC-truck electrical equipment properly grounded?
<input type="checkbox"/>	Have decontamination sites and procedures been established?
<input type="checkbox"/>	Are activities and events being logged/ documented?
<b>COMMUNICATION</b>	
<input type="checkbox"/>	Initiate actions to notify government agencies including local authorities of area affected or at risk areas via the Control Centre, General Manager or designate.
<input type="checkbox"/>	Complete notifications for emergency call-out, including regulatory agencies. This will be done by the General Manger/or designate.
<input type="checkbox"/>	If excavating, has One-Call agency been notified?
<input type="checkbox"/>	Has a Preliminary Incident Report been issued?
<input type="checkbox"/>	Has a radio channel been established for communication between the site and other personnel in field?
<b>CONSIDERATIONS</b>	
<input type="checkbox"/>	If appropriate, request surveillance fly-over to determine: <ul style="list-style-type: none"> <li>• Size and description of oil slick;</li> <li>• Direction of movement;</li> <li>• Coordinates of leading and trailing edge of oil slick;</li> <li>• Sensitivities endangered; and</li> <li>• Areas of population that are threatened.</li> </ul>
<input type="checkbox"/>	If possible, photograph the area for situational awareness.
<input type="checkbox"/>	Once support has arrived conduct transfer of command and start preparing for tactical and planning meetings.

**Records**

All documents and logs drafted during an initial response will be maintained for post incident review permanently at the Regional office.



**APPROVAL TO CONDUCT IN-SITU BURN**

Authority	Name and Organization	Approval Signature (if verbal, identify recipient)	Date
Regulatory Authority			
Unified Command			
Incident Commander (Enbridge)			
Other (Specify)			

***Confirm that all stakeholders with authority over the ability to conduct an in-situ burn are listed above and have approved the burn.***

Name (Enbridge Incident Commander)	Signature	Date



**INCIDENT INFORMATION**

Incident General Description:

Product(s) Type:

Product Description (*general hazards and characteristics*) (GPS/LLD):

MSDS attached? YES  NO

Estimated Volume Released:

Incident Discovery Date/Time:

Initial Release Date/Time (*estimated*):

**SPILL LOCATION / TRAJECTORY**

Originating Spill Location and Impacted Area General Description:

Estimated Size of Impacted Area:

Estimated Potential for Further Migration and Ultimate Area of Impact

Site Sketch Attached? YES  NO   
*(Review Book 7: 02-02-09 Incident Records for sketch components)*

Aerial / Satellite Map Graphic Attached? YES  NO

Trajectory of Spill Shown on Sketch / Graphic? YES  NO

**IN-SITU BURN ASSESSMENT**

List considerations that support in-situ burning at this location over manual / mechanical recovery and cleanup options:

Product Likely to Burn? YES  NO   
*(conduct test burn as necessary)*

Anticipate oil to remain ignitable (*fresh, not highly emulsified (>25%) or weathered*)?

**WEATHER CONDITIONS**

Weather conditions favorable for in-situ burn?	YES <input type="checkbox"/> NO <input type="checkbox"/>
General Forecast for Next 48 Hours: (e.g., stormy, clear, overcast, rainy, etc)	
Wind Speed and Direction Forecast for next 12 hours:	
Wind Speed and Direction Forecast for next 12 – 48 hours:	
Wind Speed and Direction Forecast for next 24-48 hours:	
Visibility Forecast for next 48 hours: (sufficient for burn operations/observation is >500 ft, ½ mile horizontal)	

**IN-SITU BURN OPERATIONAL FEASIBILITY**

Operational Feasibility?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is an operations plan (strategy, method, resources) and site safety plan written or in progress? (Attach if available)	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is air support needed? Available?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Are personnel properly trained, equipped with safety gear and covered by a site safety plan?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is a site communications plan available?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is the release contained?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Can all necessary equipment be mobilized during the window of opportunity (e.g., containment, igniter, residue collection equipment, fireguard)	YES <input type="checkbox"/> NO <input type="checkbox"/>
Can the burn be safely extinguished or controlled? (Attach contingency plan that identifies and manages potential impacts on surrounding area in case the burn becomes uncontrolled or secondary fires arise)	YES <input type="checkbox"/> NO <input type="checkbox"/>

Estimated area of proposed burn:	
----------------------------------	--

Attachments / Additional Information / Comments:

**SAFETY AND ENVIRONMENT CONSIDERATION**

Is there probable public safety exposure?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Are there probable environmental impacts?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Can the burn be conducted at safe distance from other response operations and public, recreation and commercial activities?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Can the public be adequately notified of the burn? (Attach notification / communication plan )	YES <input type="checkbox"/> NO <input type="checkbox"/>
Are evacuations necessary? (attach proposed evacuation plan)	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is limited shelter-in-place to be done?	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is a plan to manage environmental sensitivities (e.g., wildlife, land use, groundwater impact) written or in progress? (Attach if available)	YES <input type="checkbox"/> NO <input type="checkbox"/>
Is particulate monitoring available? (attach if available)	YES <input type="checkbox"/> NO <input type="checkbox"/>
What is the minimum public health safe distance? (Attach method used to determine distance, see Book 7: Emergency Response, 04-02-10 In-Situ Burning)	

Attach an In-Situ Burn Plan Diagram site sketch or area photo that illustrates:

- Size of burn area only (this may or may not be different than the total impacted area)
- Projected wind direction over the course of the burn duration
- Calculated minimum safe distances (shown as a radius around the burn location)
- Distances to populated areas (private, commercial, public)
- Evacuation and/or shelter-in-place areas (if applicable)
- Control measures and fire guard resources
- Smoke plume monitoring locations (if applicable)
- Impacted or nearby environmentally sensitive areas
- Adjacent land use

Attachments / Additional Information / Comments:



6.10.2 Industry Forms

National Response Center Questions (800) 424-8802

Reporting Party					
E-mail Address:					
Phone 1: Primary   Alternate   Cell   On-Scene   Other					
Last Name:					
First Name:					
Phone 2: Primary   Alternate   Cell   On-Scene   Other					
Phone 3: Primary   Alternate   Cell   On-Scene   Other					
Company:					
Organization Type: <b>Private Enterprise</b>					
Address:					
City:					
State:					
Zip Code:					
Are you calling on behalf of responsible party: YES NO					
Are you or your company responsible for material released: YES NO					
Incident Description					
Incident Date: DD // MM// YEAR		TIME:		Occurred   Discovered   Planned	
Type of Incident: <b>PIPELINE</b>					
Incident Cause: Aircraft Diversion   Criminal Intent   Cyber Attack   Derailment   Disorderly Passenger   Dumping   Transport Accident   Earthquake   Equipment Failure   Explosion   Flood   Hijacking   Hurricane   Natural Phenomenon   Operator Error   Other   Over Pressuring   Security Breach   Suicide  Suspicious Activity   Terrorism   Tornado   Transport Accident   Trespasser   Unknown   Vessel Sinking					
Incident Location					
Location Description					
Address Location:					
State:					
County					
Zip Code:					
Nearest City:			Distance from Nearest City:		
Units: Miles   Kilometers					
Direction: N NE NNE NWW NW E ENE ESE S SE SSE SSW SW W WNW WSW					
Range:		Section:		Township:	
Latitude:	Degrees:	Minutes:	Seconds:	Quadrant:	North   South
Longitude:	Degrees:	Minutes:	Seconds:	Quadrant:	East   West





**Sheen Information (Cont'd)**

Color: Barely Discernible | Brown | Dark Black | Dark Brown | Faint Colors | Grayish | Light Black | Light Brown | Other  
| Rainbow | Redish | Silvery | Unknown | Whitish | Yellowish Brown

Direction of Movement: N NE NNE NWW NW E ENE ESE S SE SSE SSW SW W WNW WSW

Odor Description:

**Impact Information**

Medium Affected: Air | Land | Subsurface | Water | Unknown | Rail Report | Other | Soil | Ballast | Non-Release

Detailed Medium Information:

Fire: YES NO Unknown

Fire Extinguished: YES NO Unknown

Injuries: YES NO Unknown

Number of Injuries:  
Number to Hospital:  
Rail Employee Injuries:  
Rail Passenger Injuries:

Fatalities: YES NO Unknown

Number of Fatalities:  
Employee Fatalities:  
Passenger Fatalities:  
Vehicle Fatalities:

Evacuations: YES NO Unknown

Number Evacuated:  
Radius/Area in Miles:  
Who was Evacuated:  
Employees | Other | Private Citizen | Everyone

Damages: YES NO Unknown

Damage in Dollars:

Road Closed: YES NO Unknown

Road:  
Major Artery: YES NO  
Hours Closed:  
Direction of Closure: All | E | EW | N | N/S | S | W

Track Closed: YES NO Unknown  
Passengers Transferred: YES NO Unknown

Track:  
Hours Closed:  
Direction of Closure: All | E | EW | N | N/S | S | W

Air Corridor Closed: YES NO Unknown

Air Corridor:  
Hours Closed:

Waterway Closed: YES NO Unknown

Waterway:  
Hours Closed:

Environmental Impact: YES NO Unknown

Type of Impact: Known Historical Asset | Marine Species  
| Other | Vegetation | Wildlife | Marine  
Species, Wildlife | Marine Species,  
Vegetation | Marine Species, Known  
Historical Asset | Marine Species, Other |  
Wildlife, Vegetation | Wildlife, Known  
Historical Asset | Wildlife, Other | Known  
Historical Asset, Other | Marine Species,  
Wildlife, Vegetation

Media Impact: High | Medium | Low | None

**Weather Information**

Weather Conditions: Clear | Foggy | Other | Overcast | Partly Cloudy | Rainy | Sleetng | Snowy | Sunny | Unknown

Air Temperature: Units: Fahrenheit Celsius

Wind Speed: Unit: Knots MPH

Wind Direction: N NE NNE NWW NW E ENE ESE S SE SSE SSW SW W WNW WSW



**Remedial Action Information**

Remedial Action Taken:

Released Secured: YES NO Unknown

Release Duration: Unit: Second | Minute | Hour | Day | Week | Month | Year

Rate of Release:

Units: Barrel(s) | Cubic Feet |  
Cup(s) | Curie(s) | Drop(s) |  
Each | Gallons | Liter(s) |  
Mil CBF | Milcurrie(s) |  
Other | Ounce(s) | Pint(s) |  
Pound(s) | Quart(s) |  
Tablespoon(s) |  
Teaspoon(s) | Ton(s) |  
Unknown

Per: Second | Minute | Hour |  
Day | Week | Month | Year

**Additional Agency Information**

Federal Agency Notified:

State/Local Agency Notified:

State/Local Agency On-Scene:

State Agency's Report Number:

**Additional Information**



**Weather Report**

<b>Incident:</b>	<b>Prepared:</b> _____ <b>at:</b> _____
<b>Period:</b> ___ / ___ / ___ : ___ to ___ / ___ / ___ : ___	<b>Version Name:</b> _____

**Present Conditions**

Wind Speed:	Wave Height:
Wind Direction From The:	Wave Direction:
Air Temperature:	Swell Height:
Barometric Pressure:	Swell Interval:
Humidity:	Current Speed:
Visibility:	Current Direction Toward:
Ceiling:	Water Temperature:
Next High Tide (Time):	Next Low Tide (Time):
Next High Tide (Height):	Next Low Tide (Height):
Sunrise:	Sunset:

**Notes:**

**24 Hour Forecast**

Sunrise:	Sunset:
High Tide (Time):	High Tide (Time):
High Tide (Height):	High Tide (Height):
Low Tide (Time):	Low Tide (Time):
Low Tide (Height):	Low Tide (Height):

**Notes:**

**48 Hour Forecast**

Sunrise:	Sunset:
High Tide (Time):	High Tide (Time):
High Tide (Height):	High Tide (Height):
Low Tide (Time):	Low Tide (Time):
Low Tide (Height):	Low Tide (Height):

**Notes:**

**Weather Report**

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**ICS 201-1 Incident Briefing Map/Sketch**

Incident:

Prepared By:                   at

Period:

Version Name:

*(This area is reserved for the Incident Briefing Map/Sketch.)*

**ICS 201-1 Incident Briefing Map/Sketch**

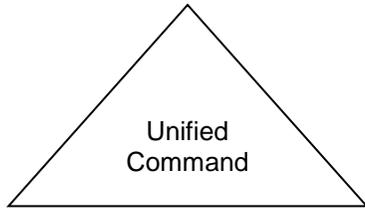
**© 1997-2013 TRG/dbSoft, Inc.**



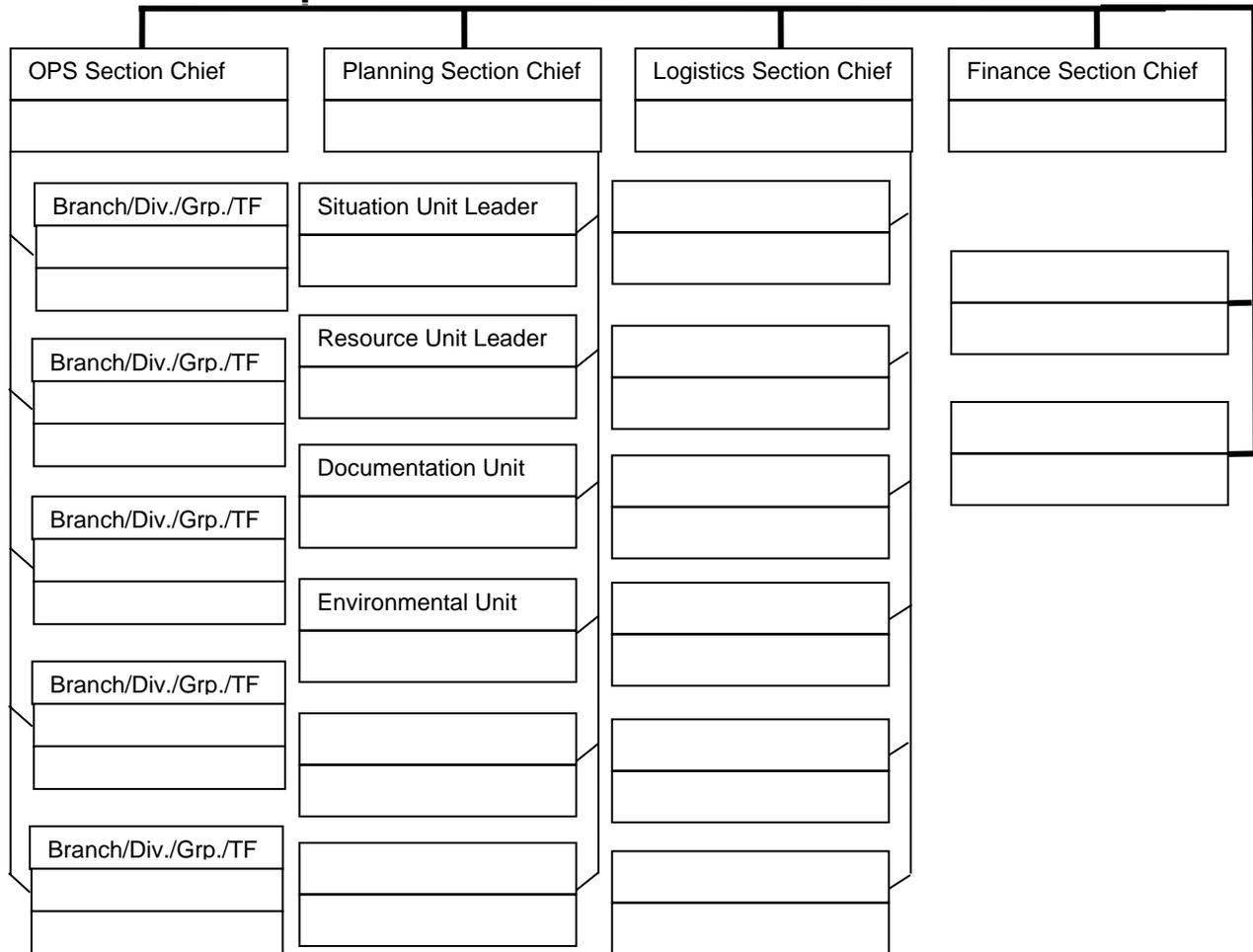


**ICS 201-3 Current Organization**

<b>Incident:</b>	<b>Prepared By:</b>	<b>at:</b>
<b>Period:</b>	<b>Version Name:</b>	



Federal	_____
State	_____
Incident Commander	_____
	_____
	_____
Safety Officer	_____
Liaison Officer	_____
Information Officer	_____



ICS 201-3 – Current Organization

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**ICS 201-5 Site Safety and Control Analysis**

<b>Incident:</b>	<b>Prepared By:</b>	<b>at:</b>
<b>Period:</b>	<b>Version Name:</b>	
<b>Site Control</b>		
1. Is Site Control set up? <input type="checkbox"/> Yes <input type="checkbox"/> No	2. Is there an on-scene command post? <input type="checkbox"/> Yes <input type="checkbox"/> No If so, where?	
3. Have all personnel been accounted for? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know	Injuries: Unaccounted:	Fatalities: Trapped:
4. Are observers involved, or rescue attempts planned? Rescuers: <input type="checkbox"/> Yes <input type="checkbox"/> No Observers: <input type="checkbox"/> Yes <input type="checkbox"/> No	5. Are decon areas setup? <input type="checkbox"/> Yes <input type="checkbox"/> No If so, where?	
<b>Hazard identification, immediate signs of: (if yes, explain in Remarks)</b>		
1. Electrical line(s) down or overhead? <input type="checkbox"/> Yes <input type="checkbox"/> No	2. Unidentified liquid or solid products visible? <input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Wind direction across incident: <input type="checkbox"/> Towards your position <input type="checkbox"/> Away from your position Wind Speed	4. Is a safe approach possible? <input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Odors or smells? <input type="checkbox"/> Yes <input type="checkbox"/> No	6. Vapors visible? <input type="checkbox"/> Yes <input type="checkbox"/> No	
7. Holes, ditches, fast water, cliffs, etc. nearby? <input type="checkbox"/> Yes <input type="checkbox"/> No	8. Fire, sparks, sources of ignition nearby? <input type="checkbox"/> Yes <input type="checkbox"/> No	
9. Is local traffic a potential problem? <input type="checkbox"/> Yes <input type="checkbox"/> No	10. Product placards, color codes visible? <input type="checkbox"/> Yes <input type="checkbox"/> No	
11. Other Hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No	12. As you approach the scene from the upwind side, do you note a change in the status of any of the above? <input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Hazard Mitigation: have you determined the necessity for any of the following?</b>		
1. Entry Objectives:		
2. Warning sign(s), barriers, color codes in place? <input type="checkbox"/> Yes <input type="checkbox"/> No		
3. Hazardous material being monitored? <input type="checkbox"/> Yes <input type="checkbox"/> No 3a. Sampling Equipment: 3b. Sampling location(s): 3c. Sampling frequency: 3d. Personal exposure monitoring:		
4. Protective gear / level: 4b. Respirators: 4d. Boots:	4a. Gloves: 4c. Clothing: 4e. Chemical cartridge change frequency:	
5. Decon 5a. Instructions: 5b. Decon equipment and materials:		
6. Emergency escape route established? <input type="checkbox"/> Yes <input type="checkbox"/> No Route?		
7. Field responders briefed on hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No		
8. Remarks:		
<b>ICS 201-5 Site Safety and Control Analysis</b>		<b>© 1997-2013 TRG/dbSoft, Inc.</b>



**ICS 208 – Site Safety Plan**

<b>Incident:</b>	<b>Prepared by:</b>	<b>at:</b>
<b>Period:</b> /    /    :    to    /    /    :	<b>Version Name:</b>	
<b>Revision:</b>		
<b>Applies To Site:</b>		
<b>Products:</b> (Attach MSDS)		

**SITE CHARACTERIZATION**

Water:	Wave Height: _____	Wave Direction: _____
Current Speed: _____	Current Direction: _____	
Land: _____	Use: _____	
Weather: _____	Temp: _____	
Wind Speed: _____	Wind Direction: _____	

**Pathways for Dispersion:**

**Site Hazards**

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Boat Safety           | <input type="checkbox"/> Fire, explosion, in-situ burning | <input type="checkbox"/> Pump hose               |
| <input type="checkbox"/> Chemical hazards      | <input type="checkbox"/> Heat stress                      | <input type="checkbox"/> Slips, trips, and falls |
| <input type="checkbox"/> Cold Stress           | <input type="checkbox"/> Helicopter operations            | <input type="checkbox"/> Steam and hot water     |
| <input type="checkbox"/> Confined Spaces       | <input type="checkbox"/> Lifting                          | <input type="checkbox"/> Trenching/Excavation    |
| <input type="checkbox"/> Drum handling         | <input type="checkbox"/> Motor vehicles                   | <input type="checkbox"/> UV Radiation            |
| <input type="checkbox"/> Equipment operations  | <input type="checkbox"/> Noise                            | <input type="checkbox"/> Visibility              |
| <input type="checkbox"/> Electrical operations | <input type="checkbox"/> Overhead/buried utilities        | <input type="checkbox"/> Weather                 |
| <input type="checkbox"/> Fatigue               | <input type="checkbox"/> Plants/wildlife                  | <input type="checkbox"/> Work near water         |
| <input type="checkbox"/> Other                 | <input type="checkbox"/> Other                            | <input type="checkbox"/> Other                   |

**Air Monitoring**

<b>%O<sub>2</sub>:</b> _____	<b>%LEL:</b> _____	<b>ppm Benzene:</b> _____
<b>ppm H<sub>2</sub>S:</b> _____	<input type="checkbox"/> <b>Other (Specify):</b> _____	

**CONTROL MEASURES**

**Engineering Controls**

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Source of release secured | <input type="checkbox"/> Valve(s) closed    | <input type="checkbox"/> Energy source locked/tagged out |
| <input type="checkbox"/> Site secured              | <input type="checkbox"/> Facility shut down | <input type="checkbox"/> Other _____                     |

**Personal Protective Equipment**

- |  |  |
|--|--|
| <input type="checkbox"/> Impervious suit           | <input type="checkbox"/> Respirators         |
| <input type="checkbox"/> Inner gloves              | <input type="checkbox"/> Eye protection      |
| <input type="checkbox"/> Outer gloves              | <input type="checkbox"/> Personal floatation |
| <input type="checkbox"/> Flame resistance clothing | <input type="checkbox"/> Boots               |
| <input type="checkbox"/> Hard hats                 | <input type="checkbox"/> Other _____         |

**Additional Control Measures**

- |   |   |
|---|---|
| <input type="checkbox"/> Decontamination      | <input type="checkbox"/> Stations established |
| <input type="checkbox"/> Sanitation           | <input type="checkbox"/> Facilities provided  |
| <input type="checkbox"/> Illumination         | <input type="checkbox"/> Facilities provided  |
| <input type="checkbox"/> Medical Surveillance | <input type="checkbox"/> Provided             |

ICS 208 Site Safety Plan

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**ICS 208 – Site Safety Plan**

**Incident:** \_\_\_\_\_ **Prepared By:** \_\_\_\_\_ **at:** \_\_\_\_\_

**Period:** \_\_\_\_ / \_\_\_\_ / \_\_\_\_ : \_\_\_\_ to \_\_\_\_ / \_\_\_\_ / \_\_\_\_ : \_\_\_\_ **Version Name:** \_\_\_\_\_

**WORK PLAN**

- |                                      |                                       |                                     |                                   |   |
|--------------------------------------|---------------------------------------|-------------------------------------|-----------------------------------|---|
| <input type="checkbox"/> Booming     | <input type="checkbox"/> Skimming     | <input type="checkbox"/> Vac trucks | <input type="checkbox"/> Pumping  | <input type="checkbox"/> Excavation               |
| <input type="checkbox"/> Heavy Equip | <input type="checkbox"/> Sorbent pads | <input type="checkbox"/> Patching   | <input type="checkbox"/> Hot work | <input type="checkbox"/> Appropriate permits used |
| <input type="checkbox"/> Other       |                                       |                                     |                                   |   |

**TRAINING**

- Verified site workers trained

**ORGANIZATION**

<u>Title</u>	<u>Name</u>	<u>Telephone/Radio</u>
Incident Commander:	_____	_____
Deputy Incident Commander:	_____	_____
Safety Officer:	_____	_____
Public Affairs Officer:	_____	_____
Other:	_____	_____

**EMERGENCY PLAN**

- Alarm system: \_\_\_\_\_
- Evacuation plan: \_\_\_\_\_
- First aid location: \_\_\_\_\_

**Notified**

- |  |       |              |
|--|-------|--------------|
| <input type="checkbox"/> Hospital                  | _____ | Phone: _____ |
| <input type="checkbox"/> Ambulance                 | _____ | Phone: _____ |
| <input type="checkbox"/> Air ambulance             | _____ | Phone: _____ |
| <input type="checkbox"/> Fire                      | _____ | Phone: _____ |
| <input type="checkbox"/> Law enforcement           | _____ | Phone: _____ |
| <input type="checkbox"/> Emergency response/rescue | _____ | Phone: _____ |

**PRE-ENTRY BRIEFING**

- Initial briefing prepared for each site

**INCLUDING ATTACHMENTS/APPENDICES**

**Attachments**

- Site Map
- Hazardous Substance Information Sheets
- Site Hazards
- Monitoring Program
- Training Program
- Confined Space Entry Procedure
- Safe Work Practices for Boats
- PPE Description
- Decontamination
- Communication and Organization
- Site Emergency Response Plan

**Appendices**

- Site Safety Program Evaluation Checklist
- Confined Space Entry Checklist
- Heat Stress Consideration
- Cold Stress and Hypothermia Consideration
- First Aid for Bites, Stings, and Poisonous Plant Contact
- Safe Work Practice for Oily Bird Rehabilitation
- SIPI Site Pre-Entry Briefing
- Personnel Tracking System
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**ICS 208 – Site Safety Plan**

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