Keystone Pipeline System Emergency Response Plan (CAN-US)

Approvals

Approvals were captured electronically and attached to the published document.

Document Contact	Emergency Management Specialist Liquids Operations Emergency, Environmental & Land Services
Document Owner Manager	Manager Emergency Management & Environmental Services Liquids Operations Emergency, Environmental & Land Services
Management Endorsement	Director Field Technical Services
Business Unit Endorsement	Vice President Liquids Field Operations

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes Company employees' names.

EXECUTIVE SUMMARY

The Keystone Pipeline System includes 2,694 miles (4,405 km) of pipeline that transports crude oil from Hardisty, Alberta to markets in the United States at Wood River, Illinois; Patoka, Illinois; Cushing, Oklahoma; Sour Lake, Texas; Nederland, Texas; and Houston, Texas. The Canadian portion of the pipeline runs from Hardisty, Alberta east into Manitoba where it turns south and crosses the border into North Dakota. From North Dakota, the pipeline runs south through South Dakota and Nebraska. At Steele City, Nebraska, one arm of the pipeline runs east through Missouri for deliveries into Hartford and Patoka, Illinois; another arm runs south through Kansas, Oklahoma, and Texas for deliveries into Cushing, Oklahoma; Sour Lake, Texas; Nederland, Texas; and Houston, Texas. Deliveries to Wood River and Patoka began in 2010. Deliveries to Cushing began in 2011. Deliveries to Nederland began in 2014. Deliveries to Houston began in 2016. Deliveries to Sour Lake began in 2016.

A critical aspect of operating the Keystone Pipeline System is to have a comprehensive Emergency Management Program. A key component of the program includes having an Emergency Response Plan (ERP). The Keystone Pipeline System ERP was prepared to achieve a number of goals: ensure regulatory compliance, serve as the response plan for all key stakeholders/rights-holders (including field operations) and all emergencies and response measures, facilitate timely internal and external notification procedures, and define training requirements. In addition, this ERP contains information related to worst case discharge, availability of response equipment, environmental sensitivities, and public officials.

This ERP is distributed to key internal and external stakeholders/rights-holders and delivered to TC Energy personnel through a secure internet portal hosted by TC Energy; the portal is internally referred to as OpenText. The plan has been submitted to the Canada Energy Regulator (CER) in Canada and the United States Department of Transportation's (DOT) - Pipeline and Hazardous Material Safety Administration (PHMSA) office. The plan will be reviewed at least annually and updated when substantial changes are made to the pipeline system or when deemed necessary by TC Energy or any regulatory agencies.

1. ACKNOWLEDGEMENT AND PLAN APPROVAL

The information and procedures in this Plan must be treated as guidelines only. The user should determine to what extent it is practical and advisable to follow them. This decision may involve considerations not discussed in this Plan.

The information and procedures contained herein are considered to be accurate as of this date and are consistent with the National Contingency Plan (NCP) and applicable Area Contingency Plans (ACP) as detailed in Section 1.5.

CERTIFICATION OF QUALIFIED INDIVIDUAL AND ALTERNATE QUALIFIED INDIVIDUAL

TC Energy hereby certifies that the individuals identified as Qualified Individual (QI) in this Plan have the full authority in accordance with the applicable United States Federal and State regulations and as detailed in this Plan to:

1. Activate and engage in contracting with oil spill removal organizations.
2. Act as a liaison with the pre-designated Federal On-Scene Coordinator (FOSC), and
3. Obligate funds required to carry out response activities.

Plan Approved:

_____	Vice President, Liquids Field Operations
Name	Title

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OPERATOR'S STATEMENT - SIGNIFICANT AND SUBSTANTIAL HARM AND CERTIFICATION OF RESPONSE RESOURCES

FACILITY NAME: Keystone Pipeline System
CORPORATE ADDRESS:

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations.

1. Is the pipeline greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length? And	Yes
2. Has any line section experienced a release greater than 1,000 barrels (159 cubic meters) within the previous five years? or	Yes
3. Has any line section experienced two or more reportable releases, as defined in 49 CFR 195.50, within the previous five years? or	Yes
4. Does any line section contain any electric resistance welded pipe, manufactured prior to 1970 and operates at a maximum operating pressure established under 49 CFR 195.406 that corresponds to a stress level greater than 50 percent of the specified minimum yield strength of the pipe? or	No
5. Is any line located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes? or	Yes
6. Is any line located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas?	Yes

Based on the U.S. DOT PHMSA criteria above, the Keystone Pipeline System is considered "Significant and Substantial Harm".

TC Energy hereby certifies to the Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation that we have identified and ensured, by contract or by other means, the availability of personnel and equipment to respond, to the maximum extent practicable, to a worst case discharge.

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_____ Vice President, Liquids Field Operations
Name Title

PHMSA Approval Letters are attached to this plan on the following pages, as listed below:

- May 19, 2009 Approval Letter
- December 12, 2013 Approval Letter
- September 30, 2015 Approval Letter
- September 26, 2017 Approval Letter
- September 6, 2022 Approval Letter

When viewing this plan electronically, with access to the TC Energy Intranet, click the links above to view approval letters. When viewing this plan without access to the TC Energy Intranet, approval letters can be located on the USB Drive accompanying the controlled plan.

REVISION HISTORY

The Revision History table captures a high-level summary of the five most recent versions (Rev. No.) of this document and the signoffs obtained for each revision.

Revision History		
Change Date	**Affected Page Numbers**	**Description of Change(s)**
October 2023	Cover Page PHMSA Letters of Approval Receipt and Delivery Flow Limits Leadership/QI Contacts 3.4 Documentation of Initial Response Actions Appendix B WCD Analysis Appendix G SDS	Document Contact Change, Document Owner Manager Change Link to new PHMSA Approval letter Receipt and Delivery Flow Rates changes Leadership/QI Contacts per Response Zone Inclusion of Indigenous Relations, Departmental Response Plan Documentation of Initial Response Actions – Security Incidents, Hurricane information Response Zones 2 – 6 WCD amount in reference to flow rate Removal of Product Name/Manufacturer Reference table
July 2022	Appendix B WCD Analysis Appendix A.4	Inclusion of Canadian Historic Discharges per response regions Separation of US OSRO Contract versus Canadian contractor requirements verbiage
January 2022	Overall Document Approvers changes Preface updates/changes Section 1 updates Section 2 Internal Notifications Response Resources Canada Procedures Section 3 Response	Grammar Cleanup, OCC to LPCC, Filenet to OpenText, InFocus to 1TC, tables formatting, structures and images formatting for clarity, new Format for entire plan Document Contact Change, Approvers Changes, VP Liquids Projects removed, VP Liquids Field Operations added TOC overall update for numerical values throughout document Port Neches Link length addition to Gulf Coast Response Zone Pipe Integrity minor flow rate increase, Pipe Integrity WCD reviews Addition of IST/CMT information, internal processes clean up Leadership adjustments, company contacts streamlined/updated SD agency name change correction Replacement of Quantum Murray with SWAT Consulting, addition of Stantec for air monitoring resources Reorganization of Section for Safety first mentality Reverification of USCG website for NRC OSRO coverages and

	Actions Appendix B WCD Analysis Media Relations Response Zone Annexes	classifications Verification of WCD analyses Media Relations doc change from Crisis Communications Plan to Incident Communications Guide Verification of WCD amounts per Appendix B
March 2021	3.5 Oil Containment, Recovery, and Disposal/Waste Management	Included additional information on stopple isolation as part of Edinburg Corrective Action Plan.
December 2020	3.3 Oil Containment, Recovery, and Disposal/Waste Management	Added Edinburg corrective action plan (CAP) language submitted to PHMSA: It will likely be necessary to implement stopple isolation in order to achieve full containment, otherwise the gravity drainage of oil will continue to recharge the rupture hole and drive the oil down the ditch line. Overtime, and depending on topography, these volumes migrating below ground may materially impact the reportable release volume and the cleanup costs.

DISTRIBUTION LIST		
Copy No.	**Title**	**Address**
1	Liquids Pipelines Control Center	
2	Liquids Pipelines Control Center Alternate Site	
3	Vice President Liquids Field Operations	
5	Director of Canadian Oil Pipeline Operations	
6	Director of US Oil Pipeline Operations	
7	Calgary Corporate Emergency Operations Center	
8 9 (electronic) 10 (Copy removed from circulation)	Canada Energy Regulator Secretary of the Board	517 Tenth Avenue SW Calgary, Alberta T2R 0A8
11 (electronic) 12 (electronic)	U.S. Department of Transportation Office of Pipeline Safety - PHMSA David K. Lehman	1200 New Jersey Avenue, SE-E-22-321 Washington, District of Columbia 20590
13	Canadian Liquids Field Operations Regional Emergency Operations Center	
14	US Liquids Field Operations Regional Emergency Operations Center	
15	US Liquids Regional Emergency Operations Center - Manager	
16	Canadian Liquids Field Operations – Emergency Preparedness Coordinator	
17	US Liquids Field Operations – Emergency Preparedness Coordinator	
18-25	Copies removed from circulation	
26	South Dakota Department of Agriculture & Natural Resources c/o Brian Walsh	523 East Capitol Ave. Pierre, South Dakota 57501-3182

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations.

27 (electronic)	Railroad Commission of Texas Oversight and Safety Division - Pipeline Safety Dept. Attn: Mr. Jim Osterhaus	P.O. Box 1267 Austin, TX 78711-2967
	NOTE: The Distribution of this Plan is controlled by the Copy Number located on the front cover. The Plan Distribution Procedures provided in Section 1.3 and the Plan Review and Update Procedures provided in Section 1.4 should be followed when making any changes. It is the responsibility of the holder of this Plan to ensure that all changes and updates are made. The Plan Holder must: • Remove and discard obsolete pages. • Replace obsolete pages with the updated pages.	

Table of Contents

1 INTRODUCTION

1.1 Plan Purpose/Objectives

The purpose of this Emergency Response Plan (ERP) is to assist TC Energy personnel in preparing for and responding quickly and safely to emergencies originating from the pipeline and associated facilities. The Plan provides techniques and guidelines for achieving an efficient, coordinated, and effective response to emergencies which may occur along the pipeline.

The specific objectives of the Plan are to:

- Establish Response Teams, assign individuals to fill the positions on the teams, and define the roles and responsibilities of team members.
- Define notification, activation, and mobilization procedures to be followed when a discharge occurs.
- Define organizational lines of responsibility to be adhered to during a response operation.
- Document equipment, manpower, and other resources available to assist with the response.
- Ensure compliance with Canadian Onshore Pipeline Regulations and the U.S. National Oil and Hazardous Substances Contingency Plan and associated Area Contingency Plan(s) for the area of operation.

The Plan takes into account 40 CFR 262.261 (c), Keystone site specific response plans should be utilized for local responses. Due to the frequency, type, quantity, and lack of unique hazards associated with any hazardous waste generation, it is not anticipated that specific arrangements are needed with local responders.

1.2 Scope of Plan

This Plan has been developed in accordance with the regulation published in the Statutory Orders and *National Energy Board Onshore Pipeline Regulations* (OPR) (SOR)/99-294, S. 32-34 – Emergency Procedures Manual and Title 49 Code of Federal Regulations (CFR) Part 194 - Response Plans for Onshore Oil Pipelines.

This Plan is meant to comply with all applicable state regulations.

This Plan contains prioritized procedures for Company personnel to manage and mitigate conditions during an emergency that could adversely affect property, the environment or the safety of workers or the public. A description of the Pipeline's details is presented in Figure 1.1 with additional information provided in the sections, appendices and annexes.

The Plan considers 40 CFR 262.261 (a) regarding actions by local personnel to respond to fires, explosions, and other unplanned incidents.

1.3 Control Plan Distribution Procedures

The Emergency Management Team is responsible for maintenance and distribution of the Plan. Distribution will be handled in the following manner:

- Distribution of controlled Plans is determined by the copy number assigned to agency and designated corporate Plan Holders. A distribution list is included in the Foreword.
- Company personnel who may be called upon to provide assistance during discharge response activities will have access to a copy of the Plan for their use and training.
- Any person holding a controlled copy of the Plan shall ensure that the copy is transferred to their replacement in the event of reassignment or change in responsibility.
- Various regulatory agencies will also be distributed a controlled copy of the Plan. The list of agencies is detailed in the Distribution List located in the Foreword.
- Members of the general public and or municipal emergency first responders may request a redacted format of this plan by placing a request here: Request a Plan

1.4 Plan Review and Update Procedures

Review/Update

The Plan resides as a web-based document, which permits authorized Corporate and field staff access to make:

- Appropriate revisions as required by operational or organizational changes.
- Appropriate revisions as required by changes in the names and phone numbers detailed in Section 2.0.
- Appropriate revisions as required by improved procedures or deficiencies identified during response team tabletop exercises or actual emergency responses.

Incorporation of Plan Revisions

Email notification allows Authorized Plan Holders to update hard copy Plans as changes occur.

The Individual Plan Holder shall:

- Review and insert the revised pages into the Plan.
- Discard or archive the obsolete pages.

Agency Revision Requirements

TC Energy shall revise and resubmit changes as required by regulation in each affected jurisdiction.

- In Canada, TC Energy files both one hard copy and one electronic copy of their respective plans with the Canada Energy Regulator (CER). When filing plan updates as required by subsection 32(2) of the OPR and paragraph 35 of the OPR “Guidance Notes”, TC Energy files a new, complete plan in both electronic and hard copy incorporating all updates. TC Energy will, at minimum, file annual plan updates by 1 April of each year or alternatively, file a letter indicating that there have been no changes to their plan.

- In the United States, TC Energy will revise and resubmit plans to the U.S. DOT-PHMSA Pipeline Response Plans Officer within 30 days of each change that would substantially affect the implementation of the Response Plan. Examples of changes in operating conditions that would cause a significant change to the Plan include:
  - An extension of the existing pipeline or construction of a new pipeline in a response zone not covered by the previously approved Plan.
  - Relocation or replacement of portions of the pipeline, which in any way substantially affect the information included in this Plan, such as a change in the Worst Case Discharge (WCD) volume.
  - A change in the type of oil handled, stored, or transferred that materially alters the required response resources.
  - A change in the name of the Oil Spill Removal Organization (OSRO).
  - A material change in capabilities of the OSRO that provides equipment and personnel.
  - A change in emergency response procedures.
  - A change in the Qualified Individual (QI).
  - A change in the NCP or an ACP that has significant impact on the equipment appropriate for response activities.
  - Any other changes that materially affect the implementation of the Plan.
  - As a result of post incident or drill evaluations.

- Additionally, the South Dakota Department of Agriculture and Natural Resources shall be notified within 30 days of any such change.

1.5 Regulatory Compliance

Canada's CER and U.S. DOT-PHMSA must be provided such revisions. The Company must submit the U.S. DOT-PHMSA issued Facility Control Number with the changes (the PHMSA Control Number is listed in Figure 1.1). In addition to periodic updates, when applicable, the Company will resubmit the Emergency Response Plan to U.S. DOT-PHMSA every five years from the date of last submission or last approval date of the Plan.

Except as provided above, amendments to the following do not require approval by U.S. DOT-PHMSA:

- Personnel and telephone number lists included in the Plan.
- Oil Spill Removal Organization(s) (OSRO) change which does not result in a material change in support capabilities.

The development, maintenance, and use of this Plan implements Company policies and addresses the following regulatory requirements and guidelines:

The response zones have been reviewed for consistency with the following plans:

- Canada – *National Energy Board Onshore Pipeline Regulations* SOR/94-294
- Canada - United States Joint Inland Pollution Contingency Plan - Annex II CANUSCENT
- CA Environment Canada National Environmental Emergencies Contingency Plan
- Greater St. Louis Sub-Area Plan
- Siouxland Sub-Area Contingency Plan

- U.S. Environmental Protection Agency (EPA) Region 5 Oil and Hazardous Substances Integrated Contingency Plan
- U.S. Environmental Protection Agency (EPA) Region 6, Regional Integrated Contingency Plan
- U.S.C.G. Sector Houston Galveston Area Contingency Plan/Central Texas Area Contingency Plan
- U.S.C.G. Southeast Texas and Southwest Louisiana Area Contingency Plan
- U.S. Environmental Protection Agency (EPA) Region 7 Regional Contingency Plan
- U.S. Environmental Protection Agency (EPA) Region 8 Regional Contingency Plan
- U.S. National Oil and Hazardous Substances Pollution Contingency Plan (NCP)

Figure 1.1 Facility Information

General Information		
Facility Name:	Keystone Pipeline System	
US DOT/PHMSA Control #:	2285	
Owner's Name:	TC Energy	
Address:	***Physical Address***	***Operator's Address***
Mainline Number:	Canada: X-XXX-XXX-XXXX (24 Hours) US: X-XXX-XXX-XXXX (24 Hours)	
Contact Person:	Emergency Management Specialist	
Primary NAICS Code:	486110	
Determination of Significant and Substantial Harm (U.S. DOT PHMSA):	All Response Zones meet the criteria for "Significant and Substantial Harm."	
Operator Statement of (U.S.DOT PHMSA) "Significant and Substantial Harm":	It is the Company's goal to respond as quickly as possible to all uncontrolled releases of crude oil, regardless of the source point location along the system. Based upon this goal, and the overbreadth of the definitions provided in 49 CFR 194.103(c)(4) & (5), the Company is compelled to consider all the active line sections listed below in the Response Zone Annexes as capable of a release potentially causing "significant and substantial harm."	

Pipeline Location	
Provinces/States/Counties:	The System covers nine specific Response Zones covering 3 Provinces, and 8 States specifically detailed in this Figure 1.1.
Provinces Traversed:	Alberta, Saskatchewan, Manitoba
States Traversed:	North Dakota, South Dakota, Nebraska, Kansas, Missouri, Illinois, Oklahoma, Texas
TC Energy Pipeline Overview Diagram:	See Figure 1.2

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, Employee names and confidential company telephone numbers.

Physical Description – Pipeline

Response Zone(s):

- The Keystone Pipeline System transports crude oil from Hardisty, Alberta to U.S. Midwest markets at Wood River and Patoka, Illinois; Cushing, Oklahoma; and Nederland and Houston, Texas. The total length of the Keystone Pipeline is 2,694 miles (4,405 km) which is divided into two sections. The Canadian portion includes 769 miles (1,241 km) of pipeline, pump stations and terminal facilities from Hardisty, Alberta to the Canadian (Manitoba)-U.S. Border (North Dakota). The U.S. portion includes approximately 1,925 miles (3,104 km) of pipeline, pump stations and terminals which extend from the Canadian (Manitoba)-U.S. Border (North Dakota), to Patoka, Illinois; Cushing, Oklahoma; Sour Lake, Texas; Nederland Texas; and Houston, Texas.
- The Keystone Pipeline System is divided into nine (9) specific Pipeline Response Zones. The Response Zones are as follows (Specific information to Response Zones are provided later in the Response Zone Appendices):

Country	Response Zones		Length (Miles)	Length (Km)
Canada	1	Hardisty Tank Terminal (includes tanks only; no pipe segments)	0	0
	2	Hardisty Pump Station, Alberta to Regina Pump Station, Saskatchewan	417.95	674.03
	3	Regina Pump Station, Saskatchewan to Haskett Pump Station, Manitoba (extending to the Canada - U.S. Border)	351.23	566.43
		Total	769.18	1,240.46
United States	4	North Dakota, South Dakota, and Nebraska	651.88	1,051.28
	5	Kansas/Missouri/Patoka, Illinois	431.67	696.16
	6	*Cushing Extension* Steele City, Nebraska/Kansas/Cushing, Oklahoma	297.20	479.29
	7	Cushing Tank Terminal (includes tanks only; no pipe segments)	0	0
	8	*Gulf Coast, Houston Lateral, Interconnects* Cushing, Oklahoma/Nederland, Texas/Houston, Texas	544.54	878.16
	9	Houston Tank Terminal (includes tanks only; no pipe segments)	0	0
	Total		1,925.28	3,104.89
Total Length			2,694.46	4,405.35

General:

- This Plan is written in English and understood by personnel responsible for carrying out the Plan.
- The Keystone Pipeline System includes pipeline sections of 30, 34 or 36-inch diameter pipe, as well as pump stations and terminal facilities.

Pipeline Specifications:

- ***Products Type:*** Crude Oil
- ***Pipe Detail:*** The pipeline system consists of several pipeline sections. The sections are indicated in Mile Post (MP) / Kilometer Post (KP).

Pipe Diameter (inches)	Mile Post		Kilometer Post		Country	Location
	From	To	From	To		
30"	0	170.4	0	274.2	Canada	Alberta to Saskatchewan Border
34"	170.4	713.7	274.2	1148.3		Western Saskatchewan to Central Manitoba
30"	713.7	770.3	1148.3	1239.4		Central Manitoba to Canadian-U.S. Border
30"	770.3	1854.5	1239.4	2983.9	United States	Canadian-U.S. Border, through North Dakota, South Dakota, Nebraska, Kansas, Missouri, to Illinois
36"	0	297.84	0	479.5		*Cushing Extension* Nebraska, through Kansas, to Oklahoma
36"	0	538.65	0	857.5		*Gulf Coast* Oklahoma to Texas

NOTE: Hardisty West Interconnect (HWI) consists of 42" diameter piping, with a 16" recirculation line back to Gibson Tanks. The length of pipe from the HWI Facility to the Hardisty Terminal is approximately 0.78 miles (1.25 km) and is 36" in diameter.

- ***Receipt and Delivery Flow Limits***

Pipeline Segment	Maximum Steady State Flow Rate (m3/hr)	Minimum Flow Rate (m3/hr)
Keystone Base	4,750	1,900
Cushing Extension	4,750	2,550
Gulf Coast	5,000	2,700
Keystone Gulf Coast (running even)	5,000	2,700

NOTE: For information about deliveries, reference the TC Energy Liquids Pipelines Operating Rules.

Response Zone Information

Response Resources:

Facility spill mitigation procedures and response guidelines are provided in Section 3.0 for discharges that could result from any of the following scenarios:

- Pipeline rupture/leak
- Explosion and/or fire
- Failure of facility piping
- Equipment failure (e.g. pumping system failure, relief valve failure, etc.)

Response Zone		Discharge Scenario	Provinces/ States Traversed	Counties Traversed
1	Hardisty Tank Terminal		Alberta	
2	Hardisty Pump Station To Regina Pump Station		Alberta, Saskatchewan, Eastern Alberta, Western Saskatchewan, Eastern Saskatchewan	
3	Regina Pump Station to Haskett Pump Station		Saskatchewan, Manitoba, Eastern Saskatchewan, Southwestern Manitoba, Western Saskatchewan	
4	North Dakota, South Dakota, and Nebraska		North Dakota	Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, Sargent
			South Dakota	Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson, Yankton
			Nebraska (Base)	Cedar, Wayne, Stanton, Platte, Colfax, Butler, Seward, Saline, Jefferson, Gage
5	Kansas, Missouri, and Illinois		Kansas (Base)	Marshall, Nemaha, Brown, Doniphan
			Missouri	Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, Audrain, Montgomery, Lincoln, St Charles
			Illinois	Madison, Bond, Fayette, Marion
6	Cushing Extension		Nebraska (Cushing Ext)	Jefferson
			Kansas (Cushing Ext)	Washington, Clay, Dickinson, Marion, Butler, Cowley

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

			Oklahoma	Kay, Noble, Payne, Lincoln
7	Cushing Tank Terminal		Oklahoma	Lincoln
8	Gulf Coast		Oklahoma	Lincoln, Creek, Okfuskee, Seminole, Hughes, Coal, Atoka, Bryan
			Texas	Fannin, Lamar, Delta, Hopkins, Franklin, Wood, Upshur, Smith, Cherokee, Rusk, Nacogdoches, Angelina, Polk, Liberty, Hardin, Jefferson, Chambers, Harris
9	Houston Tank Terminal		Texas	Harris

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Figure 1.2 TC Energy Keystone Pipeline Overview

2 NOTIFICATION PROCEDURES

This Section is a guide for notification procedures that should be implemented immediately after discovering a discharge incident and, if possible, securing the source. Internal and external notifications are described separately for clarification purposes only. All notifications are of extreme importance and must be completed in a timely manner.

2.1 Internal Notifications

The following internal notifications should be made for each emergency to the extent that the emergency demands (telephone reference is provided in Figure 2.2). In no event shall notification be delayed because the immediate supervisor is inaccessible. Authorization is given to bypass management levels if necessary, to provide timely notification to appropriate management. The typical internal notification responsibilities for each person potentially involved in the initial response are as follows:

Employee Discovering Discharge

- Call emergency services (911) directly for life threatening emergencies.
- Notify the Liquids Pipelines Control Center (LPCC) at XXX-XXX-XXXX and provide them details of the incident;
  - Request product information (Safety Data Sheet).
  - Confirm remote shut-in of affected pipe segment and identify nearest manual valves.
- Notify Regional On-Call Manager and/or Area Manager.
  - Brief Regional On-Call Manager/EOC about emergency event details.
  - Request additional resources (personnel, equipment etc. on site).
- Notify the local fire department, law enforcement, and emergency medical services, as needed.
- Ensure the Spill Response Contractor is notified, if required:
  - o Canada – ---- --------- ---.: XXX-XXX-XXXX
  - o US – ---------- ---------- ----------: XXX-XXX-XXXX
- Ensure TC Energy Regulatory Compliance is notified.
  - In Canada, call XXX-XXX-XXXX
  - In the US, call XXX-XXX-XXXX

Keystone Liquids Pipelines Control Center (LPCC)

- Verify emergency.
- Immediately notify the Corporate EOC On-Call Manager and Regional On-Call Manager.
- Notify the emergency response contractor if the employee that discovered the discharge has not already made the notification and if requested to do so.
- Notify the Vice President, Keystone Commercial Operations, Liquid PL Comm Ops.
- Notify TC Energy Regulatory Compliance
  - In Canada, call XXX-XXX-XXXX. Also call this number for US emergencies resulting in the stop of oil flow from Canada to the US.
  - In the US, call XXX-XXX-XXXX

Corporate Emergency Operations Center (EOC) Manager

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company telephone numbers, vendor names and contact information.

- Once the emergency has been verified by the Liquids Pipelines Control Center (LPCC), request contact information for Regional On-Call Manager.
- Contact the Regional On-Call Manager to confirm activation of Regional EOC and inform that the Corporate EOC will be activated.
- Notify the Corporate EOC Team and activate the Corporate EOC.
- Dial into Regional EOC conference line or Microsoft Teams site to establish communications with Regional EOC and Incident Management Team on site.
- Continue to provide support to both the Regional EOC and the Incident Management Team throughout the emergency response phase as needed.

Regional Emergency Operations Center (REOC)

- Activate Regional EOC.
- Set up the Regional conference line or Microsoft Teams site to establish communications with the Incident Management Team (IMT) and Corporate EOC.
- Immediately provide support to Incident Management Team.
- Complete all required local notifications.
- Facilitate ongoing communication between Incident Management Team and the Corporate EOC.
- Transmit appropriate Safety Data Sheet (SDS) to Incident Commander, local officials, and State Environmental Agencies.
- Notify U.S. National Response Center, the CA Transportation Safety Board National Occurrence Hot Line, CA Canada Energy Regulator, appropriate Federal agencies, County Emergency Management, Province/State Environmental Agency, and the Utilities One-Call, as needed (notification requirements and contact information are listed in Figure 2.5).

Corporate EOC Team (CEOC) Support Departments

- Attend Corporate Emergency Operations Center.
- Immediately notify Corporate CEOC Support Department senior management to inform them about the emergency event.
- Fulfill profile of service and functional plan as required based on the type of emergency event.
- Continue to provide support to Incident Management Team and Regional EOC.
- Continue to provide support to both the Regional EOC and the Incident Management Team throughout the emergency response phase as needed.

Liquids Incident Support Team (Liquids IST)

Not all emergencies will require the activation of the Liquids Incident Support Team. Concurrently, the Liquids Operations VP is the leader of the Liquid IST for the liquids line of business. The Liquids IST is activated and de-mobilized at the discretion of this IST Leader. IST members may also advise or request the activation.

The IST may remain periodically active through an emergency, repair and or restoration phases. The emergency response processes of an Incident Management Team and Emergency Operations Centers are intended to function on a stand-alone basis, though the Liquids Operations Vice President is accountable to support an emergency response in the Liquids line of business.

- Liquids personnel engaged in an emergency response may utilize the Liquids IST Leader for extraordinary approvals and incident-specific policy guidance as needed.

- Formal delegation of authority during extended absences (e.g. delegated to a director), and their Directors may also activate the Liquids IST directly during temporary absences.
- IST members advise and assist the IST Leader in assessing the business impacts arising from an incident, but do not hold responsibility for direction of an emergency response.

Crisis Management Team (CMT)

In all incidents and emergencies where the Liquids IST is activated, the IST is responsible for determining whether the incident meets the thresholds of a Crisis. If an incident is deemed a Crisis, the IST shall request the activation of the Corporate Crisis Management Team to run in parallel with the Emergency Management functions.

The Corporate Crisis Management Team is made up of appointed senior leaders up to the VP level throughout the organization to ensure effective preparedness, planning and response for crisis situations falling outside of normal emergency management structures and the capacity of the Liquids IST. The CMT is activated to provide corporate leadership for high-level (non-tactical) issues of viability, operability, creditability and support the best interests of the organization.

Figure 2.1 Emergency Activation Flowchart

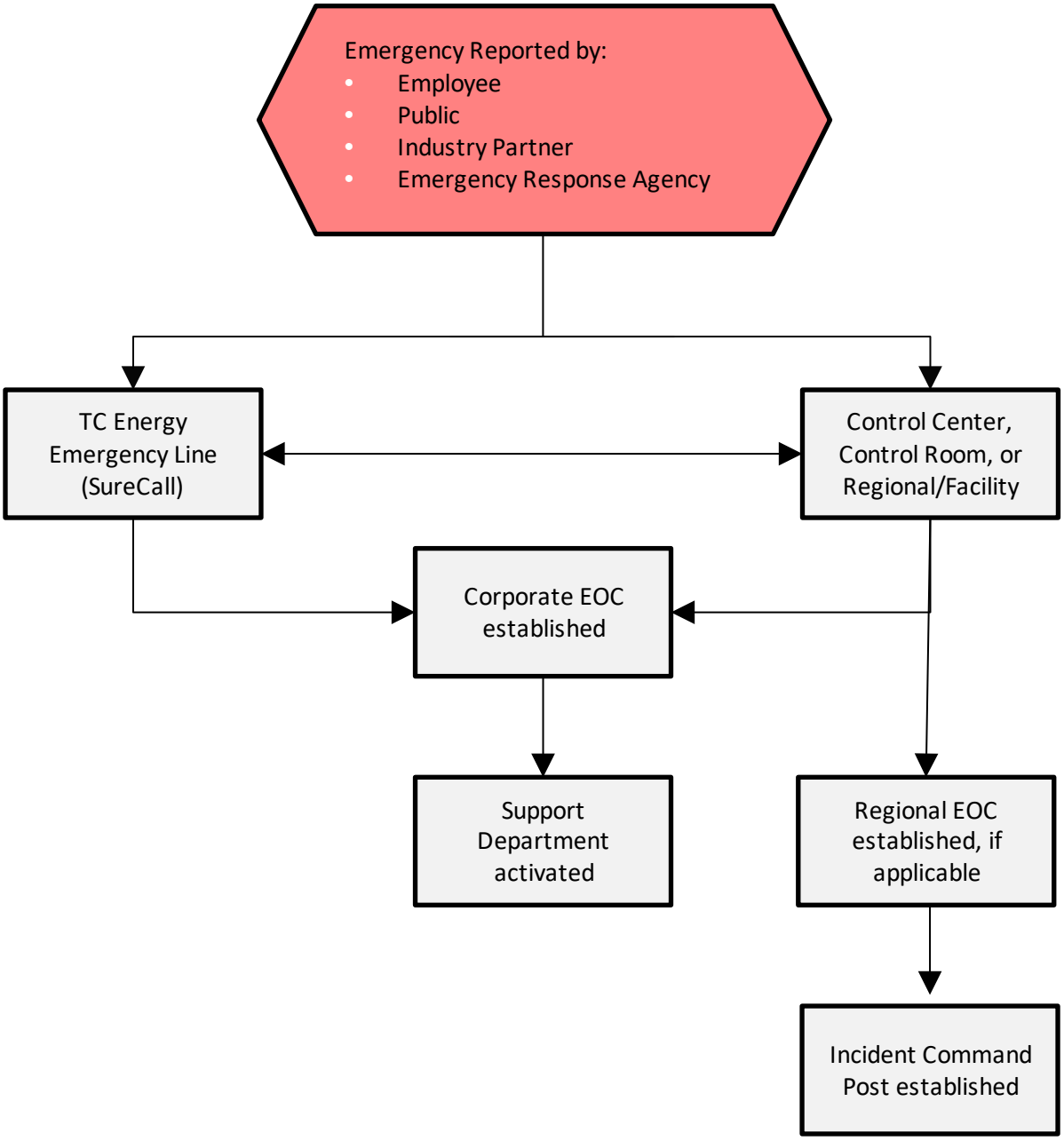


Figure 2.2 Internal Notification References

2.1.1 Internal Notification References

Internal Notification References TC Energy Organizations to notify during an emergency		
Organization	**Location**	**24 Hr Phone number**
Liquids Pipelines Control Center (LPCC)		XXX-XXX-XXXX
Canadian Regulatory Compliance		XXX-XXX-XXXX
US Regulatory Compliance		XXX-XXX-XXXX

2.1.2 Company Contacts

Company Contact References for the following Canadian Response Zones:
- **Hardisty Tank Terminal**
- **Haridsty Pump Station/Regina Pump Station**
- **Regina Pump Station/Haskett Pump Station**

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Company Contact References for the following US Response Zones:
- **North Dakota, South Dakota, Nebraska**
- **Kansas, Missouri, Illinois**
- **Cushing Extension**
- **Cushing Tank Terminal**
- **Gulf Coast**
- **Houston Tank Terminal**

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes Company employees' names, phone numbers and locations.

2.1.3 Leadership/Qualified Individual Contacts

Leadership for the following Response Zones:
- **Hardisty Terminal**
- **Hardisty Pump Station/Regina Pump Station**

FNAME	LNAME	TITLE	WORK	CELL
		Director – Canadian Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cypress Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Hardisty Area Manger	XXX-XXX-XXXX	XXX-XXX-XXXX

Leadership for the following Response Zones:

• Regina Pump Station/Haskett Pump Station				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director – Canadian Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cypress Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone: • North Dakota, South Dakota, Nebraska				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Glacial Lakes Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Gateway Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone: • Kansas, Missouri, Illinois				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Gateway Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone: • Cushing Extension				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Gateway Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cimarron Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone: • Cushing Tank Terminal				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cimarron Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone: • Gulf Coast				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cimarron Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes Company employees' names, phone numbers.

		Red River Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone:
- **Houston Tank Terminal**

FNAME	LNAME	TITLE	WORK	CELL
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Red River Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes Company employees' names, phone numbers and locations.

2.2 External Notifications

External notifications are those made to entities outside of the Company including Federal, Province/State and local regulatory agencies, as well as indigenous communities, railroad companies, and utility companies. These notifications include both verbal and written requirements.

Verbal Notification Requirements

Immediate internal notification is to be made in accordance with the Internal Notification Procedures found in Section 2.1 when a system operational failure or other type of incident occurs. This will allow immediate evaluation and classification of incidents and prompt immediate telephone notification as detailed in Figure 2.4 and 2.5 to the Transportation Safety Board, National Response Center (NRC), Province/State agencies, local agencies, and other Federal agencies as required. The information found on the Notification Data Sheet, Figure 2.3, should be used to disseminate incident information to the appropriate agencies.

For the purpose of this procedure, immediate reporting means reporting the instant a person has knowledge of an actual or suspected leak, uncontrolled release of product, any unplanned spill or other pipeline system failure. Information that causes any employee to reasonably suspect a leak or uncontrolled release of product must be immediately reported, even when the actual existence or location of a leak or release cannot yet be confirmed.

In Canada:

- Canadian Regulatory Compliance is responsible for notifying the Transportation Safety Board (TSB) / Canada Energy Regulator (CER).
- Oil Pipeline Environmental Services are responsible for notifying the respective provincial environmental and safety regulatory agencies.
- Regional EOC is responsible for notifying local officials.

In the US:

- US Regulatory Compliance is responsible for notifying the National Response Center (NRC) and Department of Transportations – Pipeline and Hazardous Materials Safety Administration (DOT-PHMSA).
- Oil Pipeline Environmental Services is responsible for notifying the respective state environmental regulatory agencies.
- Regional EOC is responsible for notifying local officials.

In all cases, if an accident has occurred on reservation lands or in proximity to indigenous communities, the affected indigenous communities will be notified by TC Energy Indigenous Relations Representatives.
For all information regarding processes to notify Indigenous Communities please see:
Indigenous Relations, Departmental Response Plan

Written Notification Requirements

In the US:

In the United States, a report is to be filed using the electronic incident/accident reporting system, as soon as practical, but not later than 30 days after discovery of the accident to the Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, US Department of Transportation. Information concerning the event shall be reported on Pipeline and Hazardous Materials Safety Administration Form 7000-1 on-line on the Pipeline and Hazardous Materials Safety Administration website. Paper reports are not required. This report is to be filed for all accidents reported by telephone and other incidents required to be reported in accordance with the criteria listed below.

The information required for completing the 30-day written report will be furnished by the Area Offices to the Regulatory Compliance Department for submission to the PHMSA. Any subsequent or additional information that was not reported on the initial written report must be reported to the Regulatory Compliance Department by the Area Office. This information will be utilized in filing a supplemental written report to the PHMSA as soon as possible, but no later than 30 days after its discovery.

In Canada:

In Canada, Canadian Regulatory Compliance shall call the Transportation Safety Board hotline immediately (or as soon as practicable but no later than three hours after an event has occurred) and shall submit an Initial Submission via the Canada Energy Regulator's OERS (Online Event Reporting System) within three hours of event occurrence.

Transportation Safety Board (TSB)
The TSB's mandate is to advance safety in air, marine, pipeline and rail transportation by:

- Conducting independent investigations, including public enquiries when necessary, into selected transportation occurrences, in order to make findings regarding their causes and contributing factors
- Identifying safety deficiencies, as evidenced by transportation occurrences
- Making recommendations designed to eliminate or reduce such safety deficiencies
- Reporting publicly on our investigations and findings in relation thereto.

Pipeline Accident in accordance with US 195.50
A pipeline accident is an occurrence resulting directly from the operation of a pipeline in which:

- Explosion or fire not intentionally set by TC Energy
- Release of five (5) gallons or more of hazardous liquid
- Death of any person
- Personal injury necessitating inpatient hospitalization
- Estimated property damage, including cost of clean-up and product recovery, value of lost product and damage to property of TC Energy and others, exceeds $50,000
    - An accident report is not required for a release of less than 5 barrels resulting from pipeline maintenance activities if:

- The release is not otherwise reportable in accordance with this procedure
- The release is not one resulting in the pollution of any body of water, including streams, rivers, lakes or reservoirs, that violates applicable water quality standards, caused a discoloration of the surface of the water or adjoining shoreline or deposited a sludge or emulsion beneath the surface of the water or upon adjoining shorelines
- The release is confined to company property or the pipeline right-of-way
- The release is cleaned up promptly

Pipeline Incident

A pipeline incident means an occurrence resulting directly from the operation of a pipeline in which

- an event or an operational malfunction results in
  - an unintended or uncontrolled release of gas,
  - an unintended or uncontrolled release of HVP hydrocarbons,
  - an unintended or uncontained release of LVP hydrocarbons in excess of 1.5 m^3, or
  - an unintended or uncontrolled release of a commodity other than gas, HVP hydrocarbons or LVP hydrocarbons;
- the pipeline is operated beyond design limits or any operating restrictions imposed by the Canada Energy Regulator;
- the pipeline restricts the safe operation of any mode of transportation;
- an unauthorized third-party activity within the safety zone poses a threat to the safe operation of the pipeline;
- a geotechnical, hydraulic or environmental activity poses a threat to the safe operation of the pipeline;
- the operation of a portion of the pipeline is interrupted as a result of a situation or condition that poses a threat to any person, property or the environment; or
- an unintended fire or explosion has occurred that poses a threat to any person, property or the environment.

TSB Classification System

The primary criterion for determining if an occurrence in any mode will be investigated is whether or not such analysis is likely to lead to a reduction of risk to persons, property, or the environment.

- Class 1 occurrence

  A class 1 occurrence is a series of occurrences with common characteristics that have formed a pattern over a period of time. This pattern is made of one or more significant safety risks previously identified by the TSB or organizations in other jurisdictions in the course of their investigations, or of an issue of interest that has emerged from statistical analysis.
- Class 2 occurrence

  A class 2 occurrence has significant consequences that attract a high level of public interest across Canada or internationally. A large number of people are affected, some of whom may be fatally or seriously injured. There may be a large release of dangerous goods. There is significant damage to property and/or the environment. There is a high public expectation

that the TSB will investigate. There is a high likelihood of identifying new safety lessons and of advancing transportation safety by reducing risks to persons, property, or the environment. A complex and exhaustive investigation is required.

- Class 3 occurrence

  A class 3 occurrence may have significant consequences that attract a high level of public interest. It may involve multiple fatalities and/or serious injuries. There may be a medium-sized release of dangerous goods. There is moderate to significant damage to property and/or the environment. There are public expectations that the TSB will investigate. It is quite likely that new safety lessons will be identified, and that transportation safety will be advanced by reducing risks to persons, property, or the environment. A detailed investigation is required.
- Class 4 occurrence

  A class 4 occurrence may have some important consequences. It may involve fatalities or serious injuries. There may be a small release of dangerous goods. There is moderate to minor damage to property and/or the environment. The occurrence attracts public interest within the immediate region or province/territory. The likelihood of identifying new safety lessons and of advancing transportation safety by reducing risks to persons, property, or the environment is low.
- Class 5 occurrence

  A class 5 occurrence has little likelihood of identifying new safety lessons that will advance transportation safety. The occurrence may involve fatalities and/or serious injuries. There is little or no release of dangerous goods. There is minimal damage to property or the environment. The occurrence attracts limited public interest outside of the immediate area. The investigation is limited to data gathering and the data are recorded for statistical reporting and future analysis.

  An occurrence that has been reported voluntarily and is not subject to the mandatory reporting requirements in the TSB Regulations may nonetheless be classified as a class 5 occurrence if it is of interest to the TSB.
- Class 6 occurrence

  A class 6 occurrence is a transportation occurrence that occurs outside of Canada and may or may not be investigated by a foreign investigation body. This includes investigations led by another country where the TSB is called upon to participate or provide assistance. The TSB is notified about these occurrences in accordance with international conventions and/or memoranda of understanding.

Canada Energy Regulator (CER)

The CER's role and responsibilities (from the CER's "Response to Emergencies" website) generally includes:

- The CER's top priority in any emergency is to make sure that people are safe and secure, and that property and the environment are protected. Any time there is a serious incident, the CER Inspectors may attend the site to oversee a company's immediate response. The CER will require that all reasonable actions are taken to protect employees, the public and the environment. Further, the CER will verify that the regulated company conducts adequate and appropriate clean-up and remediation of any environmental effects caused by the incident.

And/or

As lead regulatory agency, the CER:

- Monitors, observes, and assesses the overall effectiveness of the company's emergency response in terms of Emergency Management, Safety, Security, Environment, Integrity of operations and facilities, and Energy Supply.
- Investigates the event, either in cooperation with the Transportation Safety Board of Canada, under the Canada Labor Code, or as per the National Energy Board Act or Canada Oil & Gas Operations Act (whichever is applicable).
- Inspects the pipeline or facility.
- Examines the integrity of the pipeline or facility.
- Requires appropriate repair methods are being used.
- Requires appropriate environmental remediation of contaminated areas is conducted.
- Coordinates stakeholder/rights-holders community feedback regarding environmental clean-up and remediation.
- Confirms that a company is following its Emergency Procedures Manual(s) commitments, plans, procedures, and CER regulations and identifies non-compliances.
- Initiates enforcement actions as required.
- Approves the restart of the pipeline.

Transportation Safety Board of Canada Pipeline Occurrence Reporting	
Citation	**Description**
Extracts from Transportation Safety Board Regulations Sections 5 (1) and 5 (5)	When a reportable pipeline accident or incident takes place, the operator and any employee of the operator having direct knowledge of the accident or incident shall report to the Board as soon as possible and by the quickest means available. Where any person mentioned above makes a report, no other person referred to is required to make such a report.

Transportation Safety Board of Canada Pipeline Occurrence Reporting	
Citation	**Description**
Transportation Safety Board Regulations Pipeline Occurrences Report to Board	4. (1) The operator of a pipeline must report the following pipeline occurrences to the Board if they result directly from the operation of the pipeline: (a) a person is killed or sustains a serious injury; (b) the safe operation of the pipeline is affected by (i) damage sustained when another object came into contact with it, or (ii) a fire or explosion or an ignition that is not associated with normal pipeline operations; (c) an event or an operational malfunction results in (i) an unintended or uncontrolled release of gas, (ii) an unintended or uncontrolled release of HVP hydrocarbons, (iii) an unintended or uncontained release of LVP hydrocarbons in excess of 1.5 m3, or

	(iv) an unintended or uncontrolled release of a commodity other than gas, HVP hydrocarbons or LVP hydrocarbons; (d) there is a release of a commodity from the line pipe body; (e) the pipeline is operated beyond design limits or any operating restrictions imposed by the Canada Energy Regulator; (f) the pipeline restricts the safe operation of any mode of transportation; (g) an unauthorized third party activity within the safety zone poses a threat to the safe operation of the pipeline; (h) a geotechnical, hydraulic or environmental activity poses a threat to the safe operation of the pipeline; (i) the operation of a portion of the pipeline is interrupted as a result of a situation or condition that poses a threat to any person, property or the environment; or (j) an unintended fire or explosion has occurred that poses a threat to any person, property or the environment. Time limit (3) The person making the report must send to the Board (a) as soon as possible and by the quickest means available, all the information required under subsection (2) that is available at the time of the occurrence; and (b) the remainder of that information as soon as it becomes available within 30 days after the occurrence. Agreement (4) The Board and the operator of the pipeline may enter into an agreement regarding a format and time frame for reporting pipeline occurrences that are not likely to require immediate Board response.

Transportation Safety Board of Canada Pipeline Occurrence Reporting	
Citation	**Description**
National Energy Board Onshore Pipeline Regulations s. 52 – Incident Report	52. (1) A company shall immediately notify the Board of any incident relating to the construction, operation or abandonment of its pipeline and shall submit a preliminary and detailed incident report to the Board as soon as is practicable. (2) After notification of an incident, an inspection officer may partially or completely relieve a company from the requirement to submit a preliminary and detailed incident report. 1 "incident" means an occurrence that results in (a) the death of or serious injury to a person; (b) a significant adverse effect on the environment; (c) an unintended fire or explosion; (d) an unintended or uncontained release of LVP hydrocarbons in excess of 1.5 m3; (e) an unintended or uncontrolled release of gas or HVP hydrocarbons; (f) the operation of a pipeline beyond its design limits as determined under CSA Z662 or CSA Z276 or an operating limit imposed by the Board. (incident)

	"serious injury" includes an injury that results in (a) the fracture of a major bone; (b) the amputation of a body part; (c) the loss of sight in one or both eyes; (d) internal hemorrhage; (e) third degree burns; (f) unconsciousness; or (g) the loss of a body part or function of a body part. (blessure grave)

NOTE: Refer to Figure 2.5 for any additional Province/State written reporting requirements.

Figure 2.3 Notification Data Sheet

NOTIFICATION DATA SHEET		
Date:	Time:	
INCIDENT DESCRIPTION		
Reporter's Full Name:	Position:	
Day Phone Number:	Evening Phone Number:	
Company: TC Energy Keystone Limited Partnership/ TC Oil Pipeline Operation, Inc.	Organization Type:	
Facility Address:	Owners Address:	
Facility Latitude:	Facility Longitude:	
Spill Location (if not at Facility):		
Responsible Party's Name:	Phone Number:	
Responsible Party's Address:		
Source and/or cause of discharge: _____ _____		
Nearest City:		
County:	State:	Zip Code:
Section:	Township:	Range:
Distance from City:	Direction from City:	
Container Type:	Container Storage Capacity:	
Facility Oil Storage Capacity:		
Material:		

TOTAL QUANTITY RELEASE	WATER IMPACT (YES OR NO)	QUANTITY INTO WATER

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations.

RESPONSE ACTION(S)						
Action(s) taken to Correct, Control, or Mitigate Incident:						
Number of Injuries:	Number of Deaths:					
Evacuation(s):	Number Evacuated:					
Damage Estimate:						
More information about impacted medium: _____ _____						
Possible hazards to human health or the environment outside of the Facility: _____ _____						
CALLER NOTIFICATIONS						
US National Response Center (NRC): 1-800-424-8802		CAN Transportation Safety Board: 819-997-7887				
Additional Notifications (Circle all applicable):	USCG	CER	EPA	Province	State	Other:
NRC Incident Assigned No.						
ADDITIONAL INFORMATION						
Any information about the incident not recorded elsewhere in the report including estimated quantity and disposition of recovered material: _____ _____						
NOTE: DO NOT DELAY NOTIFICATION PENDING COLLECTION OF ALL INFORMATION.						

Figure 2.4 External Notification Flowchart

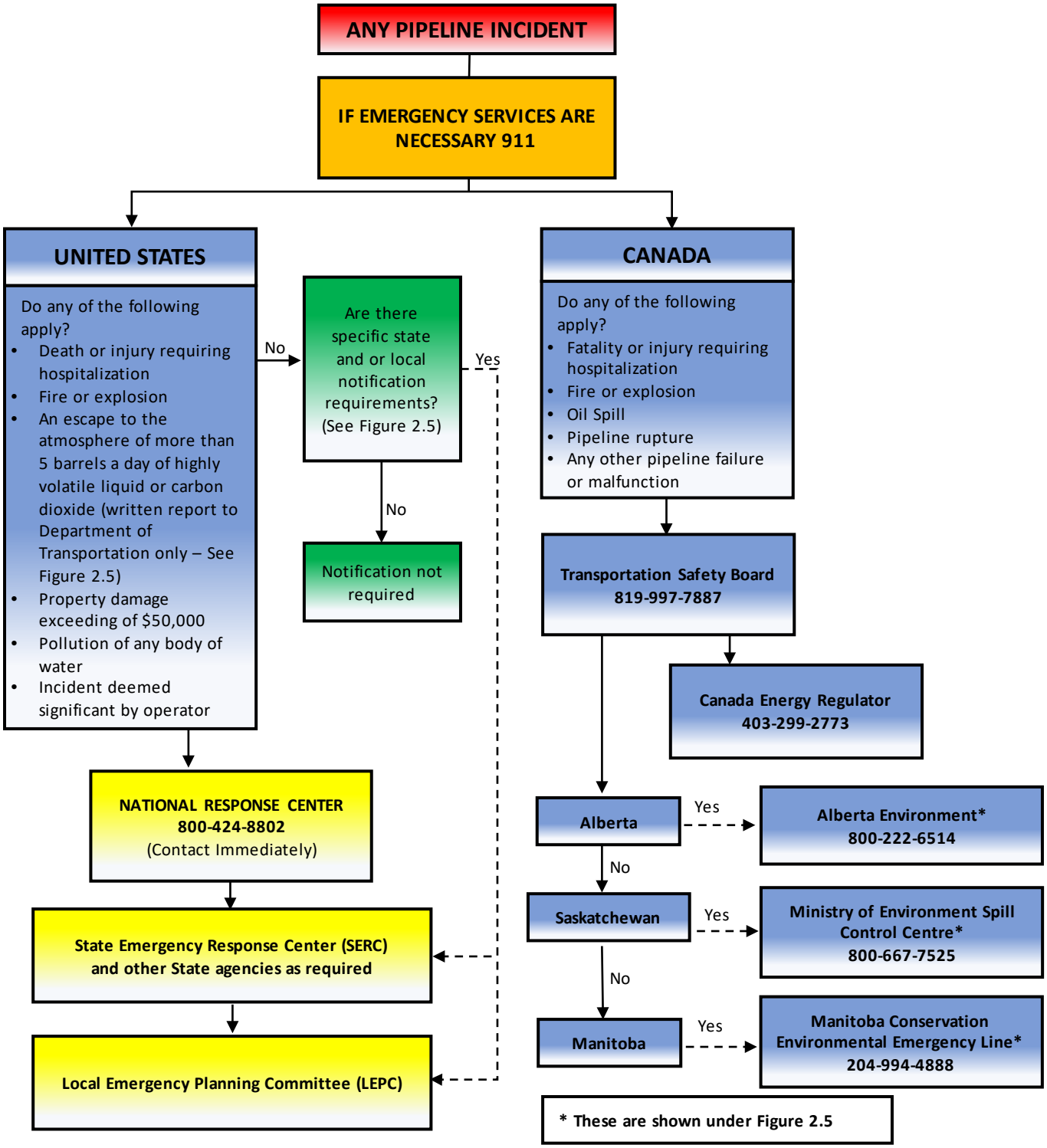


Figure 2.5 External Notification References

2.2.1 Required Federal Notifications (Canada)	
CONTACT	**REPORTING REQUIREMENTS**
Transportation Safety Board (TSB) of Canada 200 Promenade du Portage, Place du Centre 4th Floor Gatineau, Quebec 1K8 819-997-7887 800-387-3557 Facsimile 819-953-7876 Email address PipelineNotifications@tsb.gc.ca	TYPE: All pipeline accidents with fatality or serious injury, fire or explosion, oil spill, pipeline rupture or any other pipeline failure or malfunction. VERBAL: Immediately. WRITTEN: Within 30 days.
Canada Energy Regulator (CER) Suite 210, 517 Tenth Avenue SW Calgary, Alberta T2R 0A8 403 299-2773 800-899-1265	TYPE: All pipeline incidents with fatality or serious injury, fire or explosion, oil spill or hydrocarbon release, or any operation beyond the design limits of the pipeline. VERBAL: Immediately. WRITTEN: As soon as practical. NOTE: For further definition of Incident see Glossary.

2.2.2 Required Federal Notifications (United States)	
CONTACT	**REPORTING REQUIREMENTS**
National Response Center c/o United States Coast Guard (CG-5335) Stop 7581 2100 2nd Street, SW Washington, DC 20593-0001 800-424-8802 202-267-2675	TYPE: Any discharge or sighting of oil on navigable waters. VERBAL: Immediate notification required (within 1 hours). WRITTEN: If a Reportable Quantity limit is reached, refer to state requirements for written report requirements. NOTE: A call to the NRC must also be made for spills or releases of hazardous substances that meet or exceed their Reportable Quantities.
Office of Pipeline Safety and Hazardous Materials U.S. Department of Transportation 1200 New Jersey Avenue SE-E-22-311 Washington, District of Columbia 20590 202-366-4000	49 CFR 195.52 Immediate Notice of Certain Events (a) Notice requirements. At the earliest practicable moment following discovery, of a release of the hazardous liquid or carbon dioxide transported resulting in an event described in § 195.50, but no later than one hour after confirmed discovery, the operator of the system must give notice, in accordance with paragraph (b) of this section of any failure that: (1) Caused a death or a personal injury requiring hospitalization; (2) Resulted in either a fire or explosion not intentionally set by the operator; (3) Caused estimated property damage, including cost of cleanup and recovery, value of lost product, and damage to the property of the operator or others, or both, exceeding $50,000; (4) Resulted in pollution of any stream, river, lake, reservoir, or other similar body of water that violated applicable water quality standards, caused a discoloration of the surface of the water or adjoining shoreline, or deposited a sludge or emulsion beneath the surface of the water or upon adjoining shorelines; or (5) In the judgment of the operator was significant even though it did not meet the criteria of any other paragraph of this section. Special Condition 50 (Gulf Coast Response Zone) Reporting - Immediate: Keystone must provide immediate notification of all reportable incidents in accordance with 49 CFR Part 195, and shall notify the appropriate PHMSA regional office within twenty-four (24) hours of any non-reportable leaks occurring on the pipeline.
U.S. Environmental Protection Agency, Region 5 77 W. Jackson Blvd., 5th Floor Chicago, Illinois 60604 312-353-2318 312-353-2000	TYPE: Spills to navigable waters or adjoining shorelines. And discharges of oil in quantities that may be harmful to public health or the environment include those that: (1) Violate applicable water quality standards; (2) Cause a film or "sheen" upon, or discoloration of the surface of the water or adjoining shorelines; or (3) Cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. VERBAL: Call to the NRC meets the required verbal notification under DOT reporting requirement.

U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202 214-665-6595 866-372-7745	TYPE: VERBAL:	Spills to navigable waters or adjoining shorelines. And discharges of oil in quantities that may be harmful to public health or the environment include those that: (1) Violate applicable water quality standards; (2) Cause a film or "sheen" upon, or discoloration of the surface of the water or adjoining shorelines; or (3) Cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. Call to the NRC meets the required verbal notification under DOT reporting requirement.
U.S. Environmental Protection Agency, Region 7 11201 Renner Blvd. Lenexa, KS 66219 Phone: 913-551-7003 Toll free: 800-223-0425 Spill Reporting 913-281-0991	TYPE: VERBAL:	Spills to navigable waters or adjoining shorelines. And discharges of oil in quantities that may be harmful to public health or the environment include those that: (1) Violate applicable water quality standards; (2) Cause a film or "sheen" upon, or discoloration of the surface of the water or adjoining shorelines; or (3) Cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. Call to the NRC meets the required verbal notification under DOT reporting requirement.
U.S. Environmental Protection Agency, Region 8 1595 Wynkoop Street Denver, Colorado 80202 303-293-1788	TYPE: VERBAL:	Spills to navigable waters or adjoining shorelines. And discharges of oil in quantities that may be harmful to public health or the environment include those that: (1) Violate applicable water quality standards; (2) Cause a film or "sheen" upon, or discoloration of the surface of the water or adjoining shorelines; or (3) Cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. Call to the NRC meets the required verbal notification under DOT reporting requirement.

2.2.3 Federal Courtesy Notifications (United States)

Agency	Contact
PHMSA OPS Central Region Kansas City, Missouri:	816-329-3800
PHMSA OPS Southwest Region Houston, Texas:	713-272-2859
U.S. Army Corps of Engineers, Missouri Office, Missouri:	573-634-5667
Army Corps of Engineers - St. Louis District, Illinois:	314-331-8583
U.S. Corps of Engineers – Illinois:	309-794-5351

2.2.4 Required Provincial Notifications

CONTACT	REPORTING REQUIREMENTS
Alberta	

Alberta Environment & Parks 9915 -108 Street 10th Floor, Petroleum Plaza South Tower Edmonton, Alberta T5K 2G8 800-222-6514	TYPE: All spills to water or exceeds a reportable quantity or emission level. VERBAL: Immediately. WRITTEN: Within 7 days.
Saskatchewan	
Saskatchewan Environment and Resource Management Box 3003, 800 Central Avenue. Prince Albert, Saskatchewan S5V 6G1 800-667-7525	TYPE: Any oil spill to water or oil spill greater than or equal to 50 L. to land. VERBAL: Immediately WRITTEN: Within 7 days.
Manitoba	
Manitoba Conservation Environmental Emergency Line Winnipeg, Manitoba 204-994-4888	TYPE: All spills or discharges. VERBAL: Immediately. WRITTEN: As requested by the Agency.

2.2.5 Required State Notifications

CONTACT	REPORTING REQUIREMENTS
North Dakota	
Division of Emergency Management PO Box 5511 Bismarck, North Dakota 58506-5511 701-328-8100	TYPE: Any spill or discharge above RQ. VERBAL: Immediately. WRITTEN: Within 30 days
Department of Health – Environmental Health 918 East Divide Avenue Bismarck, North Dakota 58501-1947 701-328-8020 701-328-5150 701-328-5210 Hazardous Materials Emergency Assistance and Spill Reporting: 800-472-2121	TYPE: Any spill or discharge of liquid or solid (not gaseous) waste which may cause pollution of waters of the state must be reported immediately (NDAC 33-16-02.1-11 paragraph 4, bottom of page 22). The owner, operator, or person responsible for a spill or discharge must notify the department as soon as possible or the North Dakota Hazardous Materials Emergency Assistance and Spill Reporting number and provide all relevant information about the spill. Depending on the severity of the spill or accidental discharge, the department may require the owner or operator to: (1) Take immediate remedial measures; (2) Determine the extent of pollution to waters of the state; (3) Provide alternate water sources to water users impacted by the spill or accidental discharge; or (4) Any other actions necessary to protect human health and the environment

South Dakota	
Department of Agriculture & Natural Resources 523 East Capitol Ave. Pierre, South Dakota 57501-3182 605-773-3151 (Day) 605-773-3231 (Night)	A release or spill of a regulated substance (includes petroleum and petroleum products) must be reported to DENR immediately if any one of the following conditions exists: (1) The discharge threatens or is in a position to threaten the waters of the state (surface water or ground water); (2) The discharge causes an immediate danger to human health or safety; (3) The discharge exceeds 25 gallons; (4) The discharge causes a sheen on surface water; (5) The discharge of any substance that exceeds the ground water quality standards of TYPE: ARSD chapter 74:54:01; (6) The discharge of any substance that exceeds the surface water quality standards of ARSD chapter 74:51:01; (7) The discharge of any substance that harms or threatens to harm wildlife or aquatic life; (8) The discharge of crude oil in field activities under SDCL chapter 45-9 is greater than 1 barrel (42 gallons). (9) The discharge is required to be reported according to SARA Title III List of Lists, Consolidated List of Chemicals Subject to Reporting Under the Emergency Planning and Community Right to Know Act, US Environmental Protection Agency. VERBAL: Immediately. WRITTEN: As requested by the Agency
South Dakota Department of Transportation (SDDOT) 700 E. Broadway Ave. Pierre, South Dakota 57501 605-773-3265	TYPE: All spills or discharges. VERBAL: Immediately. WRITTEN: As requested by the Agency. NOTE: As requested by the Agency.

Nebraska		
Department of Environmental Quality 1200 N Street Suite 400 / PO Box 98922 Lincoln, Nebraska 68509-8922 402-471-2186 402-471-4545	TYPE:	002.01An immediate notification is required regardless of the quantity of an oil or hazardous substance release which occurs beneath the surface of the land or impacts or threatens waters of the state or threatens the public health and welfare. 002.01B Immediate notification is required of a release upon the surface of the land of an oil in a quantity that exceeds 25 gallons, or of a hazardous substance which equals or exceeds 100 pounds or its reportable quantity under Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended (40 CFR Part 302) and Section 329(3) of the Emergency Planning and Community Right-to-Know Act of 1986 (40 CFR Part 355), whichever is less. 002.01B1 Notification is not required for a release under this subsection if either of the following conditions are met: 002.01B1a The release is confined and expected to stay confined within a building or otherwise wholly enclosed structure, owned by the responsible party, in which the floors and walls are of non-earthen materials which are adequately impervious to the released substance(s) and is cleaned up within 24 hours of its discovery, or 002.02 Notification shall be made by telephone to the Department during office hours, from 8:00 a.m. to 5:00 p.m. Monday through Friday. After hours and holidays, reports shall be made to the Nebraska State Patrol. All information known about the release at the time of discovery is to be included, such as time of occurrence, quantity and type of material, location and any corrective or cleanup actions presently being taken. 002.03 After notification of the release has been made to the Department, the Department may require interim reports until any required remedial action has been completed.
	VERBAL:	Immediately, but not longer than 30 minutes.
	WRITTEN:	002.04 The Department may require a written final report for all releases of an oil or hazardous substance within 15 days after remedial action has been completed, or, if no remedial action occurs, within 15 days of the release, or in such other reasonable time period as the Department shall determine

Kansas	
Kansas Department of Health & Environment Curtis State Office Building 1000 SW Jackson Topeka, Kansas 66612 785-296-1679 785-291-3333	TYPE: All Spills that impact soil, surface water or groundwater. VERBAL: Immediately, within one hour. WRITTEN: As requested by Agency.
Kansas Dept. of Transportation Dwight D. Eisenhower State Office Building, 700 S.W. Harrison Street Topeka, Kansas 66603-3754 785-296-3566	TYPE: All spills or discharges. VERBAL: Immediately. WRITTEN: As requested by the Agency.

Missouri	
DNR, Environmental Improvement and Energy PO Box 176 Jefferson City, Missouri 65102 573-751-4919 Monday through Friday between 8:00am. and 5:00pm: 800-361-4827	TYPE: (a) Any release of hazardous substances in quantities equal to or in excess of those determined pursuant to Section 101(14) or 102 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, and Section 304 of the Superfund Amendments and Reauthorization Act of 1986, as amended; (b) Any release of petroleum including crude oil or any fraction thereof, natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas) in excess of fifty gallons for liquids or three hundred cubic feet for gases, except that the notification and reporting of any release of natural gas or natural gas mixtures by or from intrastate facilities, regardless of the quantity of such release, shall be as specified by the public service commission rather than pursuant to the notification and reporting requirements contained in, or authorized by, sections 260.500 to 260.550. Interstate natural gas pipeline facilities shall report natural gas releases to the state and the National Response Center in accordance with federal Department of Transportation regulatory requirements; Immediately, within 30 minutes VERBAL: To report an environmental concern over the phone, contact the regional office in the affected area, or call 800-361-4827 Monday through Friday between 8:00am. and 5:00pm WRITTEN: As requested by Agency.

Illinois	
Illinois Department of Natural Resources (IDNR) 1 Natural Resources Way Springfield, Illinois 62702 618-462-1181 (Region 4) 217-782-6302 (State of IL)	TYPE: Wildlife Protection / Rehabilitation VERBAL: Courtesy Reporting. WRITTEN: As the agency may request depending on circumstances.
Illinois Department of Transportation (IDOT) 2300 S. Dirksen Parkway Springfield, Illinois 62764 217-782-7820 217-782-2937	TYPE: All spills or discharges. VERBAL: Immediately. WRITTEN: As requested by the Agency.
Illinois Emergency Management Agency (SERC) 2200 South Dirksen Parkway Springfield, Illinois 62703 800-782-7860 217-782-7860	TYPE: Any Discharge or sighting of oil, or hazardous substances exceeding a reportable quantity in Cook County, IL. VERBAL: Immediately. WRITTEN: As soon as practicable after the release.

Oklahoma	
Oklahoma Department of Environmental Quality 707 N Robinson Oklahoma City, Oklahoma 73102 405-702-1000 800-522-0206	TYPE: 252:205-13-1. Incidents (a) Release of hazardous waste. Upon release of materials that are or become hazardous waste whether by spillage, leakage, or discharge to soils or to air or to surface or ground waters (outside the limits of a discharge permit), or by other means, and which could threaten human health or the environment, the owner or operator shall immediately notify the DEQ and take all necessary action to contain, remediate, and mitigate hazards from the release. (b) Contained releases. The owner/operator is not required to notify the DEQ of a release if it is completely contained in a secondary containment area. (c) National Response Center. When a report is required to be made to the National Response Center pursuant to 40 CFR 262.34 (a) (4), 262.34 (d) (5), or 264.56 (d) (2) or 265.56 (d) (2), a report must also be made immediately to the DEQ at 1-800-522-0206. (d) Determination of waste category. Spilled or leaked materials and soils and other matter that may be contaminated with such materials shall be tested by the responsible person to determine whether they are hazardous waste, nonhazardous industrial waste or solid waste. (e) Proper disposal of waste from release. Waste materials resulting from a release shall be

	properly disposed of in accordance with the applicable rules. (f) Recyclable materials. Materials that are to be recycled shall be collected and properly stored to prevent further contamination of the environment. (g) Remediation plan. The DEQ may require submission of a remediation plan that meets the closure requirements of 40 CFR 265.111 and 265.114. (h) Costs. The Executive Director may assess costs relating to expenses and damages incurred by the DEQ in responding to a release and overseeing its remediation. Costs shall be borne by the responsible person(s) VERBAL: Courtesy Reporting. WRITTEN:
Oklahoma Corporation Commission Jim Thorpe Building, 2101 N. Lincoln, Oklahoma City, OK 73105 P.O. Box 52000, Oklahoma City, OK 73152-2000 405-521-2211	TYPE: Rule OAC 165:10-7-5. Spills most commonly involve crude oil, condensate, salt water and drilling mud. Any spill to land must be reported to the OCC if it amounts to ten barrels or more of any substance used or produced in petroleum exploration or production. A spill of any quantity of these substances that comes in contact with water must also be reported. In addition, a spill of any hazardous substance used in exploration or production activities that meets the reportable quantity under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as found in 40 CFR Part 302.4, must be reported to the OCC and the DEQ. Designated hazardous substances and their reportable quantities can be found at www.access.gpo.gov/nara/cfr/index.html

<table>
<tr><th colspan="6">Texas</th></tr>
<tr><td>State of Texas Spill-Reporting Hotline
Austin, Texas
800-832-8224</td><td colspan="5">TYPE: All spills of oil or petroleum products into water and spills on land that meet or exceed 5 barrels or more.
VERBAL: Immediately.
WRITTEN: As requested.</td></tr>
<tr><td>Railroad Commission of Texas
Austin, Texas
512-463-6788</td><td colspan="5">TYPE: Pipeline operators must report all incidents or accidents on intrastate hazardous liquid pipelines reportable (See Figure 2.4)
VERBAL: Immediately (Within two hours).
WRITTEN: Written report filed within thirty (30) days</td></tr>
<tr><td>Texas Commission on Environmental Quality
12100 Park 35 Circle
Austin, TX 78753
P.O. Box 13087
Austin, TX 78711-3087</td><td colspan="5">TYPE:
VERBAL: Make notification through Texas Spill-Reporting Hotline.</td></tr>
<tr><td></td><td>Hazardous Substance</td><td>Onto land</td><td>“Final RQ” in Table 302.4 in 40 CFR 302.4</td><td>30 TAC 327</td></tr>
<tr><td></td><td></td><td>Into water</td><td>“Final RQ” or 100 lbs., whichever is less</td><td></td></tr>
<tr><td></td><td>Any oil</td><td>Coastal Waters</td><td>As required by the Texas General Land Office</td><td>Texas General Land Office</td></tr>
<tr><td></td><td>Crude Oil, oil that is neither a petroleum product nor used oil</td><td>Onto land</td><td>210 gallons</td><td>30 TAC 327</td></tr>
<tr><td></td><td></td><td>Directly into water</td><td>Enough to create a sheen</td><td></td></tr>
</table>

2.2.6 State Courtesy Notifications (United States)	
State Agency	**Contact**
North Dakota	
North Dakota Dept. of Health-Environmental Health 918 East Divide Avenue Bismarck, North Dakota 58501-1947	701-328-8020 701-328-5150 701-328-5210
North Dakota Industrial Commission State Capitol, 14th Floor, 600 E. Boulevard Ave., Dept 405 Bismarck, North Dakota 58505-0840	701-328-8020
Game & Fish, Conservation and Communication Division	701-328-6612 701-328-6300
Public Service Commission, Public Utilities Division	701-328-4077
South Dakota	
Game, Fish and Parks	605-223-7660
South Dakota Department of Transportation, ROW	605-773-3710 605-773-4249
South Dakota Public Utilities Commission	605-773-3201
Nebraska	
Department of Natural Resources	308-697-3730
Nebraska Emergency Management Agency	402-499-1219
Nebraska Game & Parks Commission	402-471-5423 402-471-0641 402-271-5440
Kansas	
Kansas Dept. of Wildlife and Parks	620-672-5911 620-672-0795
Missouri	
Missouri U.S. Fish and Wildlife Service, Columbia, Missouri	573-234-2132
Illinois	
Environmental Protection Agency - IL Office, Illinois	217-524-3908 217-785-9250
Oklahoma	
Oklahoma Department of Environmental Quality, 707 N Robinson, Oklahoma City, Oklahoma 73102	405-702-1000
Texas	
TCEQ - Area Director, Austin, Texas	512-239-3607
Texas Division of Emergency Management (TDEM) Austin, Texas	512-424-2208

2.2.7 Canada - Manitoba Local Notifications

Agency	Phone	Reporting Requirements
Manitoba Water Stewardship		
Manitoba Water Stewardship Box 11 200 Saulteaux Crescent Winnipeg, Manitoba R3J 3W3	866-626-4862 204-945-6398	Courtesy Reporting

2.2.8 US - Nebraska Local Notifications		
Agency	**Phone**	**Reporting Requirements**
Cedar County, NE (Hartington)		
County Emergency Manager	402-254-6862	Courtesy Reporting
Local Emerg Planning Commission (LEPC)	402-254-6862	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency NOTE: As requested by the Agency
Local Public Safety Answering Point (PSAP)	402-254-6885 402-254-6451	Courtesy Reporting
County Sheriff's Office	402-254-6884*	Courtesy Reporting
Wayne County, NE (Wayne)		
County Emergency Mgr.	402-833-5190 / 402-640-4116	Courtesy Reporting
Local Emerg Planning Commission	402-649-5479	Courtesy Reporting
Local Public Safety Answering Point	402-375-2626	Courtesy Reporting
County Sheriff's Office	402-375-1911*	Courtesy Reporting
Stanton County, NE (Stanton)		
County Emergency Mgr.	402-649-0085*	Courtesy Reporting
Local Emerg Planning Commission	402-439-2224	Courtesy Reporting
Local Public Safety Answering Point	402-439-2212*	Courtesy Reporting
County Sheriff's Office	402-439-2212*	Courtesy Reporting
Platte County, NE (Columbus)		
County Emergency Mgr.	402-564-1206 402-910-8898	Courtesy Reporting
Local Emerg Planning Commission	402-564-1206 402-910-8898	Courtesy Reporting
Local Public Safety Answering Point	402-564-3229*	Courtesy Reporting
County Sheriff's Office	402-564-3229*	Courtesy Reporting
Colfax County, NE (Schuyler)		
County Emergency Mgr.	402-352-7958	Courtesy Reporting
Local Emerg Planning Commission	402-352-7958	Courtesy Reporting
Local Public Safety Answering Point	402-352-8527	Courtesy Reporting
County Sheriff's Office	402-352-8514*	Courtesy Reporting
Butler County, NE (David City)		

County Emergency Mgr.	402-367-7400*	Courtesy Reporting
Local Emerg Planning Commission	402-367-7400*	Courtesy Reporting
Local Public Safety Answering Point	402-367-7400*	Courtesy Reporting
County Sheriff's Office	402-367-7400*	Courtesy Reporting
Seward County, NE (Seward)		
County Emergency Mgr.	402-643-4722 402-643-5761	Courtesy Reporting
Local Emerg Planning Commission	402-643-4722 402-643-5761	Courtesy Reporting
Local Public Safety Answering Point	402-643-3002	Courtesy Reporting
County Sheriff's Office	402-643-2359*	Courtesy Reporting
Jefferson County, NE (Fairbury)		
County Emergency Mgr.	402-729-3602 * 402-587-0303	Courtesy Reporting
Local Emerg Planning Commission	402-729-3602 * 402-587-0303	Courtesy Reporting
Local Public Safety Answering Point	402-729-3624	Courtesy Reporting
County Sheriff's Office	402-729-2284*	Courtesy Reporting
Saline County, NE (Wilber)		
County Emergency Mgr.	402-821-3010 402-826-7200	Courtesy Reporting
Local Emerg Planning Commission	402-821-3010 402-826-7200	Courtesy Reporting
Local Public Safety Answering Point	402-223-4080	Courtesy Reporting
Crete Public Safety Answering Point	402-826-4311	Courtesy Reporting
County Sheriff's Office	402-821-2111*	Courtesy Reporting
Gage County, NE (Beatrice)		
County Emergency Mgr.	402-223-1305 402-223-7031	Courtesy Reporting
Local Emerg Planning Commission	402-223-1305 402-223-7031	Courtesy Reporting
Local Public Safety Answering Point	402-223-4080	Courtesy Reporting
County Sheriff's Office	402-223-1382*	Courtesy Reporting
South Sioux City, NE		
South Sioux City, NE	402-494-7517 402-494-7500	Courtesy Reporting

* indicates 24 hour contact line.

2.2.9 North Dakota Local Notifications		
Agency	**Phone**	**Reporting Requirements**
Cavalier County, ND (Langdon)		
County Emergency Mgr.	701-256-3911	Courtesy Reporting
Local Emerg Planning Commission	701-256-2229	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency NOTE: As requested by the Agency
Local Public Safety Answering Point	701-256-2555*	Courtesy Reporting
County Sheriff's Office	701-256-2555*	Courtesy Reporting
Pembina County, ND (Cavalier)		
County Emergency Mgr.	701-265-4849	Courtesy Reporting
Local Emerg Planning Commission	701-265-4849	Courtesy Reporting
Local Public Safety Answering Point	701-265-4122*	Courtesy Reporting
County Sheriff's Office	701-265-4122*	Courtesy Reporting
Walsh County, ND (Grafton)		
County Emergency Mgr.	701-352-2311	Courtesy Reporting
Local Emerg Planning Commission	701-352-2311	Courtesy Reporting
Local Public Safety Answering Point	701-352-2041*	Courtesy Reporting
County Sheriff's Office	701-352-2041*	Courtesy Reporting
Nelson County, ND (Lakota)		
County Emergency Mgr.	701-247-2472	Courtesy Reporting
Local Emerg Planning Commission	701-247-2472	Courtesy Reporting
Local Public Safety Answering Point	701-662-5323	Courtesy Reporting
County Sheriff's Office	701-247-2474*	Courtesy Reporting
Steele County, ND (Finley)		
County Emergency Mgr.	701-845-8510 / 701-840-0404	Courtesy Reporting
Local Emerg Planning Commission	701-845-8510	Courtesy Reporting
Local Public Safety Answering Point	701-524-2742 / 701-636-4510	Courtesy Reporting
County Sheriff's Office	701-524-2742*	Courtesy Reporting
Barnes County, ND (Valley City)		
County Emergency Mgr.	701-845-8510	Courtesy Reporting
Local Emerg Planning Commission	701-845-8510	Courtesy Reporting

Local Public Safety Answering Point	701-845-8181	Courtesy Reporting
County Sheriff's Office	701-845-8530	Courtesy Reporting
Ransom County, ND (Lisbon)		
County Emergency Mgr.	701-683-6125 701-680-0847 (cell)	Courtesy Reporting
Local Emerg Planning Commission	701-683-6125	Courtesy Reporting
Local Public Safety Answering Point	701-328-9921	Courtesy Reporting
County Sheriff's Office	701-683-5255	Courtesy Reporting
Sargent County, ND (Forman)		
County Emergency Mgr.	701-724-6241 ext 113	Courtesy Reporting
Local Emerg Planning Commission	701-724-6241 ext 113	Courtesy Reporting
Local Public Safety Answering Point	800-472-2121	Courtesy Reporting
County Sheriff's Office	701-724-3302	Courtesy Reporting
City of Fargo		
City of Fargo	701-241-1310	Courtesy Reporting
Tri-County Water District		
Tri-County Water District	701-345-8240	Courtesy Reporting

* indicates 24 hour contact line.

2.2.10 South Dakota Local Notifications		
Agency	**Phone**	**Reporting Requirements**
Marshall County, SD (Britton)		
County Emergency Mgr.	605-448-2339	Courtesy Reporting
Local Emerg Planning Commission	605-448-2339	Courtesy Reporting
Local Public Safety Answering Point	605-448-5181*	Courtesy Reporting
County Sheriff's Office	605-448-5181*	Courtesy Reporting
Day County, SD (Webster)		
County Emergency Mgr.	605-345-3222*	Courtesy Reporting
Local Emerg Planning Commission	605-345-3222*	Courtesy Reporting
Local Public Safety Answering Point	605-345-3222*	Courtesy Reporting
County Sheriff's Office	605-345-3222*	Courtesy Reporting
Clark County, SD (Clark)		
County Emergency Mgr.	605-532-3822*	Courtesy Reporting
Local Emerg Planning Commission	605-532-3822*	Courtesy Reporting
Local Public Safety Answering Point	605-532-3822*	Courtesy Reporting
County Sheriff's Office	605-532-3822*	Courtesy Reporting
Beadle County, SD (Huron)		
County Emergency Mgr.	605-353-8421 605-354-1031	Courtesy Reporting
Local Emerg Planning Commission	605-353-8421 605-354-1031	Courtesy Reporting
Local Public Safety Answering Point	605-353-8550 605-353-8424	Courtesy Reporting
County Sheriff's Office	605-353-8424*	Courtesy Reporting
Kingsbury County, SD (De Smet)		
County Emergency Mgr.	605-854-3711	Courtesy Reporting
Local Emerg Planning Commission	605-854-3711	Courtesy Reporting
Local Public Safety Answering Point	605-854-3339 605-353-8550	Courtesy Reporting
County Sheriff's Office	605-854-3339*	Courtesy Reporting
Miner County, SD (Howard)		
County Emergency Mgr.	605-772-4533 605-579-0218	Courtesy Reporting
Local Emerg Planning Commission	605-772-4533 605-579-0218	Courtesy Reporting
Local Public Safety Answering Point	605-772-4501	Courtesy Reporting
County Sheriff's Office	605-772-4501*	Courtesy Reporting
Hanson County, SD (Alexandria)		
County Emergency Mgr.	605-239-4218	Courtesy Reporting
Local Emerg Planning Commission	605-239-4218	Courtesy Reporting
Local Public Safety Answering Point	605-239-4409	Courtesy Reporting

County Sheriff's Office	605-239-4409*	Courtesy Reporting
McCook County, SD (Salem)		
County Emergency Mgr.	605-421-1302	Courtesy Reporting
Local Emerg Planning Commission	605-421-1302	Courtesy Reporting
Local Public Safety Answering Point	605-995-8400 605-425-2761	Courtesy Reporting
County Sheriff's Office	605-425-2761*	Courtesy Reporting
Hutchinson County, SD (Parkston)		
County Emergency Mgr.	605-770-7927	Courtesy Reporting
Local Emerg Planning Commission	605-770-7927	Courtesy Reporting
Local Public Safety Answering Point	605-995-8400	Courtesy Reporting
County Sheriff's Office	605-387-2341*	Courtesy Reporting
Yankton County, SD (Yankton)		
County Emergency Mgr.	605-668-5289	Courtesy Reporting
Local Emerg Planning Commission	605-668-5289	Courtesy Reporting
Local Public Safety Answering Point	605-668-5210	Courtesy Reporting
County Sheriff's Office	605-668-3567*	Courtesy Reporting

* indicates 24 hour contact line.

2.2.11 Illinois Local Notifications

Agency	Phone	Reporting Requirements
Madison County, IL (Wood River)		
County Emergency Mgr.	618-296-4478 618-692-0537	Courtesy Reporting
Local Emerg Planning Commission	618-296-4478	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency NOTE: As requested by the Agency
Local Public Safety Answering Point	618-692-4443	Courtesy Reporting
County Sheriff's Office	618-692-6087*	Courtesy Reporting
Wood River Dispatch (Wood River, Roxanna, Hartford)	618-251-3114	Courtesy Reporting
City of Edwardsville	(618) 692-7520 (618) 692-7513	Courtesy Reporting
Bond County, IL (Greenville)		
County Emergency Mgr.	618-664-3531*	Courtesy Reporting
Local Emerg Planning Commission	618-664-3531	Courtesy Reporting
Local Public Safety Answering Point	618-664-2151	Courtesy Reporting
County Sheriff's Office	618-664-2151*	Courtesy Reporting
City of Greenville	(618) 664-1644	Courtesy Reporting
Fayette County, IL (Vandalia)		
County Emergency Mgr.	618-283-4292*	Courtesy Reporting
Local Emerg Planning Commission	618-283-4292*	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	618-283-2141	Courtesy Reporting
Vandalia Public Safety Answering Point	618-283-2131	Courtesy Reporting
County Sheriff's Office	618-283-2141*	Courtesy Reporting
City of Vandalia	(618) 283-1196	Courtesy Reporting
Marion County, IL (Salem)		

County Emergency Mgr.	618-548-9162	Courtesy Reporting
Local Emerg Planning Commission	618-267-0066	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	618-548-2141 ext 1	Courtesy Reporting
County Sheriff's Office	618-548-2141*	Courtesy Reporting
City of Salem	(618) 548-2222 (618) 548-3400	Courtesy Reporting
City of Patoka	(618) 432-5855	Courtesy Reporting

* indicates 24 hour contact line.

2.2.12 Kansas Local Notifications

Agency	Phone	Reporting Requirements
Marshall County, KS (Marysville)		
County Emergency Mgr.	785-562-4550	Courtesy Reporting
Local Emerg Planning Commission	618-548-9162	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	785-562-3141*	Courtesy Reporting
County Sheriff's Office	785-562-3141*	Courtesy Reporting
City of Axtell	785-736-2834 785-736-2381	Courtesy Reporting
City of Beattie	785-353-2527	Courtesy Reporting
City of Summerfield	785-244-6531	Courtesy Reporting
Nemaha County, KS (Seneca)		
County Emergency Mgr.	785-294-0091 785-336-2429	Courtesy Reporting
Local Emerg Planning Commission	785-336-2430	Courtesy Reporting
Local Public Safety Answering Point	785-336-2311*	Courtesy Reporting
County Sheriff's Office	785-336-2311*	Courtesy Reporting
City of Seneca	785-336-2747	Courtesy Reporting
Brown County, KS (Hiawatha)		
County Emergency Mgr.	785-742-1212	Courtesy Reporting
Local Emerg Planning Commission	785-742-7125	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity. VERBAL: Immediately, but not longer than 30 minutes. WRITTEN: As requested by the Agency.
Local Public Safety Answering Point	785-742-7125*	Courtesy Reporting
County Sheriff's Office	785-742-7125*	Courtesy Reporting
City of Fairview	785-467-8971	Courtesy Reporting
City of Hamlin	785-467-3521 785-467-5341	Courtesy Reporting
City of Hiawatha	785-742-2967 785-742-7417	Courtesy Reporting

City of Robinson	(785) 544-7766 (785) 544-6850	Courtesy Reporting
Doniphan County, KS (Troy)		
County Emergency Mgr.	785-985-2229	Courtesy Reporting
Local Emerg Planning Commission	785-985-2229	Courtesy Reporting
Local Public Safety Answering Point	785-985-3711*	Courtesy Reporting
County Sheriff's Office	785-985-3711	Courtesy Reporting
Marion County, KS (Marion)		
County Emergency Mgr.	620-382-2144	Courtesy Reporting
Local Emerg Planning Commission	620-382-2189	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	620-382-2144*	Courtesy Reporting
County Sheriff's Office	620-382-2144*	Courtesy Reporting
Washington County, KS (Washington)		
County Emergency Mgr.	785-325-2134	Courtesy Reporting
Local Emerg Planning Commission	N/A	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	785-325-2293*	Courtesy Reporting
County Sheriff's Office	785-325-2293*	Courtesy Reporting
Clay County, KS (Clay Center)		
County Emergency Mgr.	785-632-5802	Courtesy Reporting
Local Emerg Planning Commission	785-632-5802	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency

Local Public Safety Answering Point	785-632-5601*	Courtesy Reporting
County Sheriff's Office	785-632-5601*	Courtesy Reporting
Dickinson County, KS (Abilene)		
County Emergency Mgr.	785-263-3608	Courtesy Reporting
Local Emerg Planning Commission	785-263-1121	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	785-263-4041*	Courtesy Reporting
County Sheriff's Office	785-263-4081*	Courtesy Reporting
Butler County, KS (Augusta/El Dorado)		
County Emergency Mgr.	316-733-9796	Courtesy Reporting
Local Emerg Planning Commission	316-733-9796	Courtesy Reporting
Local Public Safety Answering Point	316-322-4254*	Courtesy Reporting
County Sheriff's Office	316-322-4254*	Courtesy Reporting
Cowley County, MO (Winfield)		
County Emergency Mgr.	620-221-0470	Courtesy Reporting
Local Emerg Planning Commission	620-221-2300	Courtesy Reporting
Local Public Safety Answering Point	620-221-5555*	Courtesy Reporting
County Sheriff's Office	620-221-5444	Courtesy Reporting
County Sheriff's Office	620-221-5555*	Courtesy Reporting

* indicates 24 hour contact line.

2.2.13 Missouri Local Notifications

Agency	Phone	Reporting Requirements
Buchanan County, MO (St. Joseph)		
City of St. Joseph Emergency Mgr.	816-236-1486	Courtesy Reporting
County Emergency Mgr.	816-383-0604*	Courtesy Reporting
Local Emerg Planning Commission	816-383-0604*	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	816-271-4777	Courtesy Reporting
County Sheriff's Office	816-271-5590	Courtesy Reporting
City of St. Joseph	(816) 271-4603	Courtesy Reporting
Clinton County, MO (Plattsburg)		
County Emergency Mgr.	816-539-2144	Courtesy Reporting
Local Emerg Planning Commission	816-539-2144	Courtesy Reporting
Local Public Safety Answering Point	816-539-2156	Courtesy Reporting
County Sheriff's Office	816-539-2156*	Courtesy Reporting
Caldwell County, KS (Kingston)		
County Emergency Mgr.	816-284-5939	Courtesy Reporting
Local Emerg Planning Commission	816-586-2311	Courtesy Reporting
Local Public Safety Answering Point	816-586-2681	Courtesy Reporting
County Sheriff's Office	816-586-2681*	Courtesy Reporting
Carroll County, MO (Carrollton)		
County Emergency Mgr.	660-542-0615 801-319-0580	Courtesy Reporting
Local Emerg Planning Commission	660-542-2178 660-329-1000	Courtesy Reporting
Local Public Safety Answering Point	660-542-3911	Courtesy Reporting
County Sheriff's Office	660-542-2828 *	Courtesy Reporting
Chariton County, MO (Brunswick)		
County Emergency Mgr.	660-973-0353	Courtesy Reporting
Local Emerg Planning Commission	660-288-3277	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes

		WRITTEN: As requested by the Agency
Local Public Safety Answering Point	660-288-3040*	Courtesy Reporting
County Sheriff's Office	660-288-3277*	Courtesy Reporting
Randolph County, MO (Moberly)		
County Emergency Mgr.	660-269-8705 ext 2035	Courtesy Reporting
Local Emerg Planning Commission	660-269-8705 ext 2035	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	660-263-0346	Courtesy Reporting
County Sheriff's Office	660-277-5095* 660-277-5822*	Courtesy Reporting
Audrain County, MO (Mexico)		
County Emergency Mgr.	573-473-5892	Courtesy Reporting
Local Emerg Planning Commission	573-473-5892	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	573-473-5800*	Courtesy Reporting
County Sheriff's Office	573-473-5800*	Courtesy Reporting
Montgomery County, MO (Montgomery)		
County Emergency Mgr.	573-564-2283	Courtesy Reporting
Local Emerg Planning Commission	573-564-2283	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	573-564-3378*	Courtesy Reporting
County Sheriff's Office	573-564-8084	Courtesy Reporting

Lincoln County, MO (Troy)		
County Emergency Mgr.	636-528-6182 636-528-6300 ext 2248	Courtesy Reporting
Local Emerg Planning Commission	636-528-6182 636-528-6300 ext 2248	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency
Local Public Safety Answering Point	636-528-6100	Courtesy Reporting
County Sheriff's Office	636-528-8546*	Courtesy Reporting
City of Troy	(636) 528-4712 ext 227 (636) 528-7562	Courtesy Reporting
St. Charles County, MO (St. Charles)		
County Emergency Mgr.	636-949-3023	Courtesy Reporting
Local Emerg Planning Commission	636-949-3023	TYPE: Any spill or discharge that meets or exceeds the federal reportable quantity. VERBAL: Immediately, but not longer than 30 minutes. WRITTEN: As requested by the Agency.
Local Public Safety Answering Point	636-949-0809 ext 1*	Courtesy Reporting
County Sheriff's Office	636-949-0809 ext 1*	Courtesy Reporting

* indicates 24 hour contact line.

2.2.14 Oklahoma Local Notifications

Agency	Phone	Reporting Requirements
Kay County, OK (Newkirk/Ponca City)		
County Emergency Mgr.	580-362-3825	Courtesy Reporting
Local Emerg Planning Commission	580-767-0380	Courtesy Reporting
Local Public Safety Answering Point	580-763-8011	Courtesy Reporting
County Sheriff's Office	580-353-2517 *	Courtesy Reporting
Noble County, OK (Perry)		
County Emergency Mgr.	580-710-7030	Courtesy Reporting
Local Emerg Planning Commission	580-336-1717	Courtesy Reporting
Local Public Safety Answering Point	580-336-3517*	Courtesy Reporting
County Sheriff's Office	580-336-3517*	Courtesy Reporting
Payne County, OK (Stillwater)		
County Emergency Mgr.	405-533-6875	Courtesy Reporting
Local Emerg Planning Commission	405-533-6875	Courtesy Reporting
Local Public Safety Answering Point	405-372-4522*	Courtesy Reporting
County Sheriff's Office	405-372-4522*	Courtesy Reporting
Lincoln County, OK (Chandler)		
County Emergency Mgr.	405-240-6198	Courtesy Reporting
Local Emerg Planning Commission	405-240-7741	Courtesy Reporting
Local Public Safety Answering Point	405-258-9933*	Courtesy Reporting
County Sheriff's Office	405-258-1191	Courtesy Reporting
Ofuskee County, OK (Okemah)		
County Emergency Mgr.	918-623-9289*	Courtesy Reporting
Local Emerg Planning Commission	918-623-9289*	Courtesy Reporting
Local Public Safety Answering Point	918-623-1234	Courtesy Reporting
County Sheriff's Office	918-623-1122*	Courtesy Reporting
Seminole County, OK (Wewoka)		
County Emergency Mgr.	405-257-5445*	Courtesy Reporting
Local Emerg Planning Commission	405-257-5445* 405-220-2557*	Courtesy Reporting
Local Public Safety Answering Point	405-382-9340	Courtesy Reporting
County Sheriff's Office	405-257-5445*	Courtesy Reporting
Hughes County, OK (Holdenville)		
County Emergency Mgr.	405-379-7740	Courtesy Reporting
Local Emerg Planning Commission	405-379-7740	Courtesy Reporting
Local Public Safety Answering Point	405-379-2203*	Courtesy Reporting
County Sheriff's Office	405-379-2203*	Courtesy Reporting
Coal County, OK (Coalgate)		
County Emergency Mgr.	580-258-0603	Courtesy Reporting
Local Emerg Planning Commission	580-258-0151	Courtesy Reporting
Local Public Safety Answering Point	580-927-2121*	Courtesy Reporting
County Sheriff's Office	580-927-2121*	Courtesy Reporting

Atoka County, OK (Atoka)		
County Emergency Mgr.	580-889-4038	Courtesy Reporting
Local Emerg Planning Commission	580-889-2221*	Courtesy Reporting
Local Public Safety Answering Point	580-889-2221*	Courtesy Reporting
County Sheriff's Office	580-889-2221*	Courtesy Reporting
Creek County, OK (Salpulpa)		
County Emergency Mgr.	918-227-0278	Courtesy Reporting
Local Emerg Planning Commission	918-227-6358	Courtesy Reporting
Local Public Safety Answering Point	918-224-4964*	Courtesy Reporting
County Sheriff's Office	918-224-4964*	Courtesy Reporting
Bryan County, OK (Durant)		
County Emergency Mgr.	580-924-3661	Courtesy Reporting
Local Emerg Planning Commission	580-924-3661	Courtesy Reporting
Local Public Safety Answering Point	580-924-3737	Courtesy Reporting
County Sheriff's Office	580-924-3000*	Courtesy Reporting

* indicates 24 hour contact line.

2.2.15 Texas Local Notifications		
Agency	**Phone**	**Reporting Requirements**
Fannin County, TX (Bonham)		
County Emergency Mgr.	903-640-8484	Courtesy Reporting
Local Emerg Planning Commission	903-640-8484	Courtesy Reporting
Local Public Safety Answering Point	903-583-2143	Courtesy Reporting
Bonham Public Safety Answering Point	903-583-2144	Courtesy Reporting
County Sheriff's Office	903-583-2143*	Courtesy Reporting
Lamar County, TX (Paris)		
County Emergency Mgr.	903-737-2410	Courtesy Reporting
Local Emerg Planning Commission	903-737-2411	Courtesy Reporting
Local Public Safety Answering Point	903-784-7655	Courtesy Reporting
County Sheriff's Office	903-737-2400*	Courtesy Reporting
Delta County, TX (Cooper)		
County Emergency Mgr.	903-395-4400 ext 243	Courtesy Reporting
Local Emerg Planning Commission	903-395-4400 ext 243	Courtesy Reporting
Local Public Safety Answering Point	903-395-2146*	Courtesy Reporting
County Sheriff's Office	903-395-2146*	Courtesy Reporting
Hopkins County, TX (Sulphur Springs)		
County Emergency Mgr.	903-439-6217	Courtesy Reporting
Local Emerg Planning Commission	903-439-6217	Courtesy Reporting
Local Public Safety Answering Point	903-438-4040*	Courtesy Reporting
County Sheriff's Office	903-438-4040*	Courtesy Reporting
Franklin County, TX (Mt. Vernon)		
County Emergency Mgr.	903-537-2342 ext 225	Courtesy Reporting
Local Emerg Planning Commission	903-537-4539*	Courtesy Reporting
Local Public Safety Answering Point	903-537-4539*	Courtesy Reporting
County Sheriff's Office	903-537-4539*	Courtesy Reporting
Wood County, TX (Quitman)		
County Emergency Mgr.	903-763-2356	Courtesy Reporting
Local Emerg Planning Commission	903-763-2356	Courtesy Reporting
Local Public Safety Answering Point	903-763-2201*	Courtesy Reporting
County Sheriff's Office	903-763-2201*	Courtesy Reporting
Upshur County, TX (Gilmer)		
County Emergency Mgr.	903-240-3574	Courtesy Reporting
Local Emerg Planning Commission	903-240-3574	Courtesy Reporting
Local Public Safety Answering Point	903-843-2541*	Courtesy Reporting
County Sheriff's Office	903-843-2541*	Courtesy Reporting
Smith County, TX (Tyler)		
County Emergency Mgr.	903-590-2652	Courtesy Reporting
Local Emerg Planning Commission	903-590-2652	Courtesy Reporting
Local Public Safety Answering Point	903-566-6600	Courtesy Reporting
County Sheriff's Office	903-590-2600*	Courtesy Reporting

Rusk County, TX (Henderson)		
County Emergency Mgr.	903-657-0326	Courtesy Reporting
Local Emerg Planning Commission	903-657-0326	Courtesy Reporting
Local Public Safety Answering Point	903-657-3581*	Courtesy Reporting
County Sheriff's Office	903-657-3581*	Courtesy Reporting
Cherokee County, TX (Rusk)		
County Emergency Mgr.	903-683-5947	Courtesy Reporting
Local Emerg Planning Commission	903-683-5947	Courtesy Reporting
Local Public Safety Answering Point	903-683-2271*	Courtesy Reporting
County Sheriff's Office	903-683-2271*	Courtesy Reporting
Nacogdoches County, TX (Nacogdoches)		
County Emergency Mgr.	936-560-7871 936-652-1349	Courtesy Reporting
Local Emerg Planning Commission	936-560-7871 936-652-1349	Courtesy Reporting
Local Public Safety Answering Point	936-559-2607*	Courtesy Reporting
County Sheriff's Office	936-560-7794	Courtesy Reporting
Angelina County, TX (Lufkin)		
County Emergency Mgr.	936-634-8731	Courtesy Reporting
Local Emerg Planning Commission	936-634-8731	Courtesy Reporting
Local Public Safety Answering Point	936-633-0356	Courtesy Reporting
Lufkin Public Safety Answering Point	936-634-3331 936-829-5586	Courtesy Reporting
County Sheriff's Office	936-634-3332	Courtesy Reporting
Polk County, TX (Livingston)		
County Emergency Mgr.	936-327-6826	Courtesy Reporting
Local Emerg Planning Commission	936-327-6826	Courtesy Reporting
Local Public Safety Answering Point	936-327-6810*	Courtesy Reporting
County Sheriff's Office	936-327-6810*	Courtesy Reporting
Hardin County, TX (Kountze)		
County Emergency Mgr.	409-246-5119	Courtesy Reporting
Local Emerg Planning Commission	409-246-5119	Courtesy Reporting
Local Public Safety Answering Point	409-246-5100*	Courtesy Reporting
County Sheriff's Office	409-246-5100*	Courtesy Reporting
Liberty County, TX (Liberty)		
County Emergency Mgr.	936-334-3219	Courtesy Reporting
Local Emerg Planning Commission	936-334-3219	Courtesy Reporting
Local Public Safety Answering Point	936-336-4500*	Courtesy Reporting
County Sheriff's Office	936-336-4500*	Courtesy Reporting
Jefferson County, TX (Jefferson)		
County Emergency Mgr.	409-835-8757	Courtesy Reporting
Local Emerg Planning Commission	409-835-8757	Courtesy Reporting
Local Public Safety Answering Point	409-835-8411	Courtesy Reporting

County Sheriff's Office	409-983-8350*	Courtesy Reporting
County Engineer	409-835-8584	In any such emergency, contact the County Engineer by phone at (409) 835-8584, and inform him of the proposed emergency repairs. As soon as practical, but no later than 48 hours after the start of emergency repairs, notify the County Engineer in writing of the emergency repairs effected, detailing the repairs and the reasons immediate action was required.
Chambers County, TX (Anahuac)		
County Emergency Mgr.	409-267-2445	Courtesy Reporting
Local Emerg Planning Commission	409-267-8343	Courtesy Reporting
Local Public Safety Answering Point	409-267-2500	Courtesy Reporting
County Sheriff's Office	409-267-2500	Courtesy Reporting
Harris County, TX (Houston)		
Harris County Homeland Security and Emergency Management	713-881-3100	Courtesy Reporting
Local Emerg Planning Commission	281-635-0677	Courtesy Reporting
Local Public Safety Answering Point	713-221-6000	Courtesy Reporting
County Sheriff's Office	713-221-6000	Courtesy Reporting
Sheldon Fire & Rescue (Station 2)	281-456-9255	Courtesy Reporting
Crosby Fire Department	281-328-2300	Courtesy Reporting
Port Authority of Houston (For incidents impacting San Jacinto River, Cedar Bayou, and Muleshoe Lake)	713-670-3611* (emergency) 713-670-3620* (non-emergency)	Upon becoming aware of an escape of any substance from the Pipeline, POHA Permit Licensee shall immediately notify the Port, and confirm such notification in writing no later than ten (10) days after the escape of the substance, whether or not it causes damage or destruction to individuals, entities or property, and whether or not civil penalties or fines are incurred. The notice shall state the location and duration of the escape, and the nature of the substance that escaped.

* indicates 24 hour contact line.

2.2.16 Response Resources – Planning and Incident Support (Canada)		
Oil Spill Removal Organizations		
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
		XXX-XXX-XXXX
Incident Management Services		
		XXX-XXX-XXXX
Air Monitoring Services		
	Canada (Several Locations)	XXX-XXX-XXXX
	Canada (Several Locations)	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential vendor names and contact information.

2.2.17 Response Resources – Planning and Incident Support (United States)		
Oil Spill Removal Organizations		
		XXX-XXX-XXXX
Incident Management Services		
		XXX-XXX-XXXX
Air Monitoring Services		
		XXX-XXX-XXXX
		XXX-XXX-XXXX

3 RESPONSE ACTIONS

3.1 Safety Awareness

It is the corporate policy of the Company to provide a safe workplace for all workers. All employees and contractors are responsible for maintaining the safety and health of all workers on the pipeline and the response operations.
Prior to engaging in any spill response activity:

- All employees/contractors must have received safety orientation.
- All U.S. contractor response personnel must be in compliance with Occupational Safety and Health Administration training requirements.
- All other personnel will have completed appropriate training for their position as outlined in Section 4.0.
- No employee/contractor shall engage in activities without the appropriate protective equipment and training.

Response Safety

All Company and contractor personnel are expected to comply with the Site Safety Plan for each spill incident.

- Any concern regarding health or safety issues should be immediately addressed.
- The First Responder must consider the spill site as dangerous and the local atmosphere explosive until air monitoring procedures prove that the area is safe.
- The First Responder must exit the area against or across the wind, if possible, and must also evacuate others who are working in the area.
- All injuries, no matter how minor, must be reported to the Incident Commander in a timely manner.
- Prior to entering a spill area, a qualified person must perform an initial safety and health evaluation of the site.

Personal Air Monitoring

A Safety Officer shall be designated who is trained in the operation of air monitoring equipment can oversee air monitoring personnel. The Incident Commander must ensure that Safety Officers are trained and that their equipment is maintained and ready for use.

- The air monitoring equipment shall be activated and checked at the location in which it is stored.
- Calibration of instruments should be performed before use.
- Air monitoring measurements which are to be made prior to entry into the spill area include:
    - Oxygen content
    - Lower Explosive Limit (LEL) with a pentane calibrated instrument
    - Benzene level

H2S

- Lower Explosive Limit readings above 10% require immediate evacuation of the area and elimination of ignition sources.
- Oxygen readings below 19.5% require the use of air supplied respiratory protection.
- After assuring that there are no hazards relating to explosion or oxygen depletion, sampling for benzene or total petroleum hydrocarbons shall dictate the appropriate respiratory devices to be used by persons entering the area.
- Benzene levels must be below 0.5 ppm to work without respiratory protection. At a level of greater the 0.5 but less than 5 ppm a half face respirator may be used. When the level is between 5.0 and 25 ppm a full face respirator must be used. Anything readings higher than 25 ppm, a supplied air or Self Contained Breathing Apparatus must be used.

If H2S is present in low concentrations respiratory protective equipment may be used following the following criteria based on approved protection factors. Using the approved protection factors of 10 for ½ face respirators and 50 for full face and the most stringent OEL which is 1 ppm (Canadian Federal COHSR) the corresponding maximum use concentrations would be 10 ppm for ½ face and 50 ppm for full face. The use of respirators however should be limited to areas with concentrations less than 10 ppm. If concentrations are higher workers should immediately leave the area.

- Hydrogen Sulfide is an extremely hazardous toxic compound that is present in most crude oils that are transported through the pipeline.
- Air monitoring for Hydrogen Sulfide will be done by all personnel working on or near the pipeline and during any cleanup operation.
- Hydrogen Sulfide is characterized by a rotten egg smell at low level concentrations.
- The gas causes rapid temporary paralysis of the olfactory system leading to the loss of the sense of smell.
- Permissible exposure limits in many countries is 10 ppm. In Canada the occupational exposure level is 1 ppm.

Symptoms of exposure to Hydrogen Sulfide are:

- 0-10 ppm no known health effects for most people
- 10-100 ppm can cause headache, dizziness, nausea (100 ppm is the immediately dangerous to life and health level)
- 100-500 ppm above mentioned effects within a short time and more severe. Loss of breathing and death is possible within minutes.
- 500-700 ppm affects the central nervous system. Symptoms could include a loss of balance and a loss of reasoning. You could become unconscious and stop breathing within seconds
- 700 and greater would result in immediate loss of consciousness and permanent brain damage due to hypoxia or death if not rescued immediately
- The Incident Commander is responsible for arranging industrial hygiene monitoring in the post discovery period.

Decontamination

Through training programs, response personnel know and understand the importance of the removal of hazardous substances from their person if they are contaminated. Eyewash stations and safety showers

provide a means to quickly remove gross contamination of harmful agents, including gasoline. Personnel must immediately shower and remove any clothing which is wet or otherwise contaminated. Showers in the change room are to be used for thorough cleansing. Persons should inspect themselves thoroughly before donning a fresh change of clothing.

Contaminated clothing should be properly disposed. Contaminated personal protective equipment must be washed and sanitized before re-using. The washing of contaminated equipment is performed in a "contained area" to assure that the disposal of the wash water can be handled properly.

Establishing "Exclusion - Hot", "Decontamination - Decon", (warm) and "Support - Safe" (cold) Zones are required to prevent the removal of contaminants from the contaminated area as well as unauthorized entry into contaminated areas.

- Regardless of the decontamination facilities available, all efforts to minimize personnel exposure should be taken.
- Decontamination facilities should be positioned prior to employee/ contractor entrance to areas where the potential for exposure to contamination exists. The appropriate Safety Data Sheets (SDS) are available to aid health professionals treating the injured parties. Safety Data Sheets are located in Appendix G or available through the Liquids Pipelines Control Center.
- Decontamination facilities should be designed to prevent further contamination of the environment and should have a temporary storage area for items that will be reused in the contaminated area.
- Particular attention should be paid to personal hygiene prior to eating, drinking, or smoking.

Personal Protective Equipment (PPE)

The following represents OSHA/US EPA designated PPE levels for responding to emergencies, post emergency cleanup sites, and/or Temporary Storage and Disposal (TSD) sites. The responder's PPE should be chosen based on his/her level of training and assigned job duties.

PPE Level	Level of Hazard by Characteristic	PPE Required
Level A *To be selected when the greatest level of skin, respiratory, and eye protection is required.*	• The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin, • Substances with a high degree of hazard to the skin are known or	• Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH). • Totally encapsulating chemical-protective suit. • Coveralls. • Long underwear. • Gloves, outer, chemical resistant. • Gloves, inner, chemical resistant. • Boots, chemical-resistant, steel toe and shank. • Hard hat (under suit).

PPE Level	Level of Hazard by Characteristic	PPE Required
	suspected to be present, and skin contact is possible; or • Operations must be conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.	• Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally encapsulating suit).
Level B *The highest level of respiratory protection is necessary, but a lesser level of skin protection is needed.*	• The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. • The atmosphere contains less than 19.5 percent oxygen; or • The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin. Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.	• Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved). • Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls). • Coveralls. • Gloves, outer, chemical resistant. • Gloves, inner, chemical resistant. • Boots, outer, chemical-resistant, steel toe and shank. • Boot-covers, outer, chemical-resistant • (disposable). • Hard hat.) • Face shield.
Level C *The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.*	• The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin; • The types of air contaminants have been identified, concentrations measured, and an air- purifying respirator is available that can remove the contaminants; and • All criteria for the use of air-purifying respirators are met.	• Full-face or half-mask, air purifying respirators (NIOSH approved). • Hooded chemical-resistant clothing (overalls; two- piece chemical-splash suit; disposable chemical- resistant overalls). • Coveralls. • Gloves, outer, chemical resistant. • Gloves, inner, chemical resistant. • Boots (outer), chemical resistant steel toe and shank. • Boot-covers, outer, chemical-resistant • (disposable). • Hard hat. • Escape mask. • Face shield.
Level D	• The atmosphere contains no known hazard; and	• Coveralls. • Gloves.

PPE Level	Level of Hazard by Characteristic	PPE Required
A work uniform affording minimal protection: used for nuisance contamination only.	• Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals. • Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.	• Boots/shoes, chemical-resistant steel toe and shank. • Boots, outer, chemical-resistant (disposable). • Safety glasses or chemical splash goggles. • Hard hat. • Escape mask. • Face shield.

3.2 Medical Treatment and First Aid

Call 911 immediately. On-site emergency medical response requires the same rapid assessment of the patient as any other situation but requires the responders to be aware of other considerations that may affect the way they handle the patient. These considerations include the following:

- The potential for contamination of the patient, responders, and equipment should be addressed. Responders should arrange to treat all patients after the injured party has been decontaminated according to the Site Safety Plan.
- Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness.
- If the treatment needed is critical care or "lifesaving" treatment, rapid decontamination of the injured/ill party should be started. Refer to the Site Safety Plan for steps to be taken in an "abbreviated" decontamination for medical treatment.
- The need for full decontamination should be carefully weighed against the need for prompt medical treatment.
- The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant.
- Safety Data Sheet information will be available from the Incident Commander and should be provided to medical personnel to alert them of decontamination requirements.
- Report all injuries, incidents or close calls.
- If emergency medical treatment is needed, the Incident Commander or Safety Officer, or his designated representatives, will request assistance from trained medical personnel.

3.3 Initial Response Actions

Initial response actions are those taken by local personnel immediately upon becoming aware of a discharge or emergency incident, before the Initial Response Team (described in Section 4.0) is formed and functioning. Timely implementation of these initial steps is of the utmost importance because they can greatly affect the overall response operation.

The pages that follow discuss initial response actions for a variety of emergencies that have the possibility of occurring. These emergencies are discussed in the order listed below:

- Initial Response Actions
- Line Rupture or Leak (Piping, Valve, or Manifold)
- Fire (Minor, Major, Explosion)
- Severe Thunderstorm (Flash Flood/Landslide)
- Tornado/Straight Line Winds
- Earthquake
- Severe Winter Storm
- Volcanic Eruptions
- Security Incidents
- Abnormal Pipeline Operations
- Entrained Oil in Soil
- Release to Groundwater
- Hurricane

It is important to note that these actions are intended only as guidelines. The appropriate response to a particular incident may vary depending on the nature and severity of the incident and on other factors that are not readily addressed.

!	**NOTE:** Without exception, employees and public safety is the first priority.

The first TC Energy representative will function as the Company First Responder until relieved by an authorized individual who will assume the Incident Commander (IC) role. The role of IC will typically be assumed and retained by area management as appropriate.

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

Keystone Pipeline System Response Time Standard			
Phase	**Response Time Standard**	**Actions**	**Description**
Phase 1	Initiated immediately upon recognition of a pipeline emergency	Pipeline Shutdown Issolation	The remote shutdown of the pipeline through a control center should be undertaken immediately upon recognition of an emergency. Conduct notification to local personnel to initiate manual closures of valves.
Phase 2	2 Hours	Emergency Response Activities	The structuring of an emergency response management system should be undertaken immediately upon recognition of an emergency. The establishment of the

			Incident Command System should occur in no more than two hours. This can be through the establishment of an Incident Commander, preparation of the ICS 201 Form or other ICS driven activity.
Phase 3	3 Hours	Staff on-site	Company First Responder on scene within 3 hours, weather permitting safe travel to location.
Phase 4	6 Hours	Initial Emergency Response Equipment on-site	Initial response equipment should be on-site no more than 6 hours from recognition of an emergency, with additional supporting requirements taking no more than 72 hours. This can be achieved with in-house, mutual aid, spill cooperatives or contracted response equipment. Emergency Response equipment is based on a calculated formula that determines worst case discharge amounts, which, in turn, determine the planned amount of equipment for response.

Certain conditions may interfere with TC Energy's ability to meet the Response Time Standard set forth in this Section. In all cases, safety of employees and the public remains the priority in response to an emergency; safety will not be compromised to meet the Response Time Standard. Some examples of conditions which may impede TC Energy's ability to meet the Response Time Standard are listed below; when evaluating the timeliness of response, these conditions are considered:

- Remote locations and locations with road accessibility
- Time of day
- Weather conditions
- Past weather conditions (road closures, site not accessible due to flooding, etc.)
- Communication infrastructure integrity (i.e. systems compromised due to infrastructure outages)
- Transportation issues – (i.e. road closures, traffic accidents, rush hour)
- Site seizure
- Other agency/government interference

Initial Response Actions – Summary Personnel and Public Safety First Priority			
Response Time*			
US DOT Tier	1	2	3
High Volume Area	6 HR	30 HR	54 HR
All Other Areas	12 HR	36 HR	60 HR

*Response resources and personnel available to respond within time specified after discovery of a worst case discharge per US DOT 49 CFR Part 194.115

In addition to the potential emergency events outlined in this Section, the Company has identified several "abnormal operations" that could be expected in the pipeline facilities. The Company has defined the events and established procedures to identify, eliminate or mitigate the threat of a worst case discharge due to these events. In compliance with 49 CFR 195.402(d), these procedures are defined in the Company's Operations Manual.

The guidelines in this section promote incident management through the following general objectives:

- Control
  - Eliminate sources of ignition
  - Isolate the source of the discharge, minimize further flow
- Notify
  - Make internal and external notifications
  - Activate local Company personnel as necessary
  - Activate response contractors and other external resources as necessary
- Contain
  - Begin spill mitigation and response activities
  - Monitor and control the containment and clean-up effort
  - Protect the public and environmentally sensitive areas

In all emergencies, the following actions should be taken:

Company First Responder / On Scene

- Verify the emergency exists while remaining a safe distance from the scene.
  - Exclude all persons from large spills 800m (1/2mile) in all directions, remaining upwind, uphill, and/or upstream if possible.
  - Attempt to notify people at risk without entering the hazard area.
  - Size up the situation – extent of spill area/volume, facilities at risk, ignition potential, drain to waterway, etc.
- Ensure notification of emergency services (Fire, Law Enforcement, EMS) and local authorities by calling 911.
  - Call 911 directly for life safety issues, uncontrolled emergencies, or when response assistance required.
  - Advise local officials of the possible need for downwind evacuation 0.5km (0.3mi)

day/0.8km (0.5 mi) night.

- Notify the Liquids Pipelines Control Center (LPCC)
  - Provide details of incident and request product information (Safety Data Sheet).
  - Confirm remote shut-in of affected pipe segment and identify nearest manual valves.
  - First Responder should not leave the incident site to operate valves; instead, send another qualified TC Energy employee to close and lockout valves.
- Notify Regional On-Call Manager and/orArea Manager. (This serves as the Qualified Individual notification.)
  - Brief Regional On-Call Manager/EOC about emergency; request needed resources (personnel/equipment).
  - Direct LPCC or Regional EOC to provide courtesy notification of incident to local officials if there is no immediate life safety emergency.
  - Consider activation of Oil Spill Removal Organizations (OSROs), Contractors and COOPs for resource support.
- Log all decisions and actions on the ICS 201 Incident Briefing Form.
  - Complete the Initial Health & Safety Plan – ICS 201-5.
- Prepare for response.
  - Secure/restrict access to the site/adjacent area as needed. Maintain hot (exclusion) zone of 800m (1/2 mile).
  - Consult with local responding organizations to request managing the response in a Unified Command (UC) approach, identifying the appropriate Commanders/Organizations in the makeup of the UC.
    - Provide determination within Current and Planned Actions ICS 201-2.
  - To approach the scene/establish hot zone, don appropriate personal protective and respirator equipment.
- Respond – But do not put yourself at risk.
  - Initiate and maintain air monitoring (with 4-Gas and Benzene Monitors).
  - Isolate the source/minimize loss of product - if it is safe and you are properly trained and equipped.
  - Develop and communicate Job Safety Analysis (JSA) prior to commencing non-critical response operations.
- If approached by media, provide a Media Relations card. Remain in communication with Regional EOC through the Conference Bridge or MS Teams.
- Transfer command using the ICS 201 Form when a qualified TC Energy representative arrives on scene.

Regional Emergency Operation Center

- Ensure local emergency agencies have been contacted (police, fire, medical, emergency management).
- Assign personnel immediately to the discharge site to assist with emergency response and spill containment.
- Activate additional company and response contractors to site as situation demands.
- Confirm safety aspects at site, including need for Personal Protective Equipment (PPE), removal of sources of ignition, and potential need for evacuation.
- Evaluate the severity, potential impact, safety concerns and response requirements based on the initial data provided by the Company First Responder. Refer to the spill response evaluation flowchart in this section.

- Establish communications with the Corporate Emergency Operations Center.
- Perform notifications using Figure 2.1, as appropriate.

Area Management

- Proceed to spill site and coordinate response and clean-up operations.
- Assume the role of Incident Commander if appropriate.
- Coordinate/perform activation of additional spill response contractors, as the situation demands (telephone reference is provided in Figure 2.5).
- Direct containment, dispersion, and/or clean-up operations in accordance with the "Product Specific Response Considerations" provided in Figure 3.2.
- Complete the "Product Release Report" provided in Appendix F.

Local Company Personnel

- Assigned personnel will immediately respond to a discharge from the Pipeline or Facility, as the situation demands.
- Assist as directed at the spill site.
- Assume Incident Management Team roles as deemed by Incident Commander

Range of Reported Oil Thicknesses Tool						
	Barely Discernible	**Silvery Sheen**	**Rainbow Colors**	**Darkening Bands of Color**	**Dull Colors**	**Light Brown**
Reported average threshold, Microns	0.09	0.1	0.6	0.9	2.7	8
Range, microns	0.04 - .016	0.05 - 0.18	0.1 - 1.0	0.1 - 2.5	1.0 - 5.5	2.0 - 15.0

lFigure 3.1 Spill Classification

Spills/Releases to Environment:

Minor

- A spill/release, onsite, that poses neither adverse effect to the environment nor impact to a water body or to groundwater. The spill may or may not be reportable to a regulatory agency.

Serious

- A spill/release, onsite or off-site/off-right-of-way, that poses an adverse effect to the environment but no impact to a water body or groundwater.

Major

- A spill/release, onsite or off-site/off-right-of-way, that has the potential to pose an adverse effect to the environment including an impact to a water body (water sources or otherwise) or rural water groundwater system.

Critical

- Emergency response for containment or cleanup is required. A spill/release, onsite or off-site/off-right-of-way, that poses an adverse effect to the environment including an impact to a water body (drinking water source or otherwise) or rural groundwater systems.

Complaints - Health & Safety:

Minor

- Unverified community complaint from a landowner, police, fire, municipality, or a ministry.
- Verified employee complaint where an investigation is required to obtain resolution.

Serious

- Verified community complaint likely to cause danger/risk to the public, employees or TC Energy facilities.

Major

- Employee work refusal based on belief of unhealthy or unsafe work conditions.

Critical

- Regulatory body notified of employee complaint (by employee) and investigates employee work refusal.

Specific Incident Response Checklist

Remember, without exception, personnel safety is the first priority, excessive exposure to the vapor and liquid stages of the spilled product should be avoided.

The following sections describe initial response activity for specific types of incidents. They are intended as guidelines. Each individual responsible for a response action must evaluate each action to ensure Personal Safety prior to conducting that action.

Initial Response

All Roles

- Ensure all "Company First Responder" responsibilities and actions, listed earlier in this section, are complete.
- If approaching the scene, don appropriate Personal Protective Equipment (PPE).
    - Initiate and maintain air monitoring (with 4-Gas and Benzene Monitors)
    - Eliminate possible sources of ignition in the near vicinity of the spill.
- Log all decisions and actions during response on the ICS 214a – Chronology of Events Log/Individual Log.

All personnel are reminded that only TC Energy employees, TC Energy contractors, and emergency services are allowed in the area during the time of an emergency and that statements issued to the media or other interested parties should be given by designated Company Management. Be courteous with media representatives and direct them to the designated spokesperson.

Line Rupture or Leak (Piping, Valve or Manifold)

Liquids Pipelines Control Center

- Shutdown pipeline.
- Close upstream and downstream block valves.
- Notify On-call regional designate to attend site as a First Responder.
- Notify Liquids Pipeline Control Center On-call designate.
- Initiate Regional EOC Manager Notification once incident is confirmed by First Responder or when multiple triggers exist.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
    - If the page is not answered within 15 minutes, Liquids Pipelines Control Center will contact the Emergency Line (SureCall) and direct them to locate/contact an EOC Manager.
- Notify Canadian Regulatory Compliance Hotline.
- Notify US Regulatory Compliance Hotline.
- If the pipeline is or will be shutdown for more than one hour, notify Oil Movements Scheduling.
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - XXX-XXX-XXXX
    - XXX-XXX-XXXX
- Ensure all receipt and delivery interconnects are notified and updated as required.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company telephone numbers.

Fire (Minor, Major, Explosion)

All Personnel

Be aware of Fire Weather conditions.

- Watch - Critical fire weather conditions are forecast to occur.
- Red Flag Warning - Critical Fire weather conditions are either occurring or will shortly.

Individual Discovering the Fire (All Employees)

- Call the Local Emergency Response Agency (911).
- Notify Liquids Pipelines Control Center (this should be the 1st notification completed in the event that it is a remote location with no immediate impacts to life safety).
- Notify Area Management.
- Complete all Company First Responder roles requirements and responsibilities.
- Ensure ongoing communications with Liquids Pipelines Control Center.
- Follow the instructions outlined in section 3.1 Initial Response and the Responsibilities outlined in TC Energy's Company First Responder checklist.

!	**NOTE:** Pipeline right-of-way are used by Firefighters as a fire break (barrier) to isolate fires and prevent them from growing. Right-of-ways are commonly used as access to fire areas. Many times, Firefighters will need to increase the size of the cleared space over the Pipeline right-of-way to prevent the fire from leaping from treetop to tree top. To do this, heavy equipment may be used to quickly increase the amount of cleared space between the fire area and unignited forest. The following are steps to consider when working with the local authority on creating these fire breaks.

- Use your best judgment to ensure the safety of staff, fire ground workers and the public when determining if this activity is safe to perform;
- Call and confirm with Asset Reliability if this activity is safe and implement any instructions provided by Asset Reliability. Asset Reliability's role is to provide directions to protect the health and safety of those involved as well as pipeline integrity;
- Be physically on site to coordinate the activities related to any pipeline crossings;
- Stake the pipeline to identify the location of the pipe(s) in the right-of-way.
- First preference is to use already existing pipeline crossing areas;
- Gather the appropriate information to complete a formal pipeline crossing agreement. In Canada, send required information to the Land Department in Calgary.
- Notify the Liquids Pipelines Control Center and area management.
- If time allows, coordinate with Liquids Pipelines Control Center to request pumps be shutdown. (Use station Emergency Shutdown when necessary.)
- Coordinate with the Liquids Pipelines Control Center to close appropriate valves to isolate in the vicinity of the fire, if necessary.
- Evacuate site as safety considerations dictates.
- Notify the Liquids Pipelines Control Center of evacuation route and final destination.
- Notify the Liquids Pipelines Control Center of safe arrival.
- Inspect pump station, equipment and controls after the fire is extinguished and safe to return.

- Evaluate pipeline, monitoring or control systems for evidence of heat damage.
- Notify engineering to conduct further investigation if damage is found.
- Make appropriate repairs and return Pipeline to service.

Third Party Call In Confirmation of Fire

This procedure applies to a pipeline facility integrity threat identified received via third party thru TC Energy Emergency Line (SureCall) or direct call to Liquids Pipelines Control Center reporting a fire at or adjacent to Keystone Pipeline Facilities or ROW.

If the third party indicates a pipeline facility (Pump Station/QMU Building/ESB Building etc.) is on fire or in jeopardy of catching fire the controller will do the following:

- Should the call come from SureCall, confirm receipt of third party call-in contact information. If third party call-in comes direct to Liquids Pipelines Control Center, please fill out third party call-in form Third Party Template.
- Once confirming all information with the caller and it is clear that the pipeline facilities are at risk, implement the following steps:
  - Shutdown and Isolate the affected pump station OR
  - Confirm, checking with leak triggers and discussion with third party, that the fire is not due to a pipeline failure.
- Once confirmed that the source is not us, keep the pipeline running.
- Notify On-call regional designate to investigate as a Company First Responder and provide further guidance.
- Initiate Regional EOC Manager Notification once incident is confirmed by Company First Responder or if multiple triggers exist.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
- Notify Liquids Pipelines Control Center On-call designate.
- Notify Oil Movements Scheduling.
  - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
  - XXX-XXX-XXXX
  - XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company telephone numbers.

Aerial Pipeline Patrol Confirmation of Fire

If the Liquids Pipelines Control Center receives a call from the Aerial Pipeline Patrol indicating a fire on or adjacent to Keystone Pipeline ROW/Facilities, the controller's response will be as follows:
If the pilot/observer indicates a pipeline facility (Pump Station/QMU Building/ESB Building etc.) is on fire or in jeopardy of catching fire the controller will do the following:

- Once confirming all information from the pilot/observer is clear that the pipeline facilities are at risk.
- Shutdown and Isolate the affected pump station.

- Notify On-call regional designate to investigate as a Company First Responder and provide further guidance.
- Initiate Regional EOC Manager Notification once incident is confirmed by Company First Responder or if multiple triggers exist.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
- Notify Liquids Pipelines Control Center On-call designate.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database

If the pilot/observer indicates a fire on or adjacent to our Pipeline ROW, the controller will do the following:

- Confirm, checking with leak triggers and discussion with third party, that the fire is not due to a pipeline failure.
- Once confirmed that the source is not us keep the pipeline running.
- Notify On-call regional designate to investigate as a Company First Responder and provide further guidance.
- Initiate Regional EOC Manager Notification once incident is confirmed by Company First Responder.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
- Notify Liquids Pipelines Control Center On-call designate.

Company Employee Confirmation of Fire

If the integrity threat is confirmed by a TC Energy Employee that has been dispatched as a Company First Responder to a third party call-in of a fire, at or adjacent to Keystone Pipeline Facilities or ROW, the controller's response will be as follows:

- Confirm isolation of affected area, including valve positions with Regional personnel and commence further isolation or pipeline shutdown strategy with Regional personnel as required.
- Should the recommendation from the field be to shutdown the pipeline, the controller is to do a controlled shutdown and isolate as per Pipeline Isolation and Segmentation Standards
- Confirm the Emergency Management System (EMS) has been initiated and the Calgary EOC is active. Continue Monitoring pressure profiles using Supervisory Control and Data Acquisition (SCADA) / Leak Detection System (LDS).
- Ensure all receipt and delivery interconnects are notified and updated as required.
- Notify Liquids Pipelines Control Center On-call designate.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - XXX-XXX-XXXX
    - XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company telephone numbers.

Potential Keystone Integrity threats from TC Energy Gas Pipe ROW Rupture/Fire

This procedure applies to a Keystone Pipeline integrity threat from an adjacent TC Energy Gas Pipeline rupture/fire in the conversion Pipeline ROW.
In the Event that the controller receives a suspected or a confirmed notification of a TC Energy Gas Pipeline rupture/fire adjacent to Keystone Oil Pipeline, the controller is to do the following:

- Confirm thru SCADA/LDS that pressures and flow rates are steady and that no other leak triggers are present.
- If no other leak triggers are present, the controller is to drive Keystone Pipeline to safe discharge limits and continue running.
- Notify On-call designate/first responder that the Keystone Pipeline is still running and will await their direction once they arrive on scene.
- First responder will instruct the controller to shutdown or continue running once on scene and the integrity of Keystone Pipeline has been assessed.
- Notify Liquids Pipelines Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - XXX-XXX-XXXX
    - XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company telephone numbers.

If one or more leak triggers exist, the controller is to initiate an Emergency Pipeline Shutdown and isolate as per Pipeline Isolation and Segmentation Standards

- Notify On-call designate/company first responder that the Keystone Pipeline has been shutdown and we will await their direction once they arrive on scene.
- Notify Liquids Pipelines Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - XXX-XXX-XXXX
    - XXX-XXX-XXXX

Potential Keystone Integrity threats from TC Energy GasPipe Shared Pump Stations

This procedure applies to a Keystone Pipeline integrity threat from an adjacent TC Energy Gas Pipeline rupture/fire at a shared pump station.

In the event that the suspected or confirmed TC Energy Gas Pipeline rupture/fire occurs at a shared pump station facility, the controller is to do the following:

- Confirm thru SCADA/LDS that pressures and flow rates are steady and that no other leak triggers are present.

- If no other leak triggers are present, the controller is to isolate the pump station from the mainline and drive Keystone Pipeline to safe discharge limits and continue running.
- Notify On-call designate/first responder that the Keystone Pipeline is still running and will await their direction once they arrive on scene.
- First responder will instruct Keystone Pipeline Operator to shutdown or continue running once on scene and the integrity of Keystone Pipeline has been assessed.
- Notify Liquids Pipelines Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - XXX-XXX-XXXX
    - XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company telephone numbers.

If one or more leak triggers exist, the controller is to initiate an Emergency Pipeline Shutdown and isolate as per Pipeline Isolation and Segmentation Standards

- Notify On-call designate/company first responder that the Keystone Pipeline has been shutdown and the pump station has been isolated and will await their direction once they arrive on scene.
- Notify Liquids Pipelines Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Liquids Pipelines Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - XXX-XXX-XXXX
    - XXX-XXX-XXXX

Severe Thunderstorm (Flash Flood/Landslide)

Thunderstorms are a year round occurrence with lightning a major threat. The potential of flash flooding is also possible when one area is affected for an extended period.

- Be aware of changing weather conditions.
  - Severe Thunderstorm Watch - Conditions are favorable to the development of thunderstorms.
  - Severe Thunderstorm Warning - A severe thunderstorm has been observed or is imminent.
  - Flash Flood Watch- Flash flooding is possible within 6 hours after heavy rains have ended.
  - Flash Flood Warning - Flash flooding is occurring or imminent.
- Terminate outdoor work when lightning is occurring and move to shelter.
- Avoid areas subject to sudden flooding until the thunderstorm passes.
- Evaluate the situation after weather event.
  - Does standing water prevent visual inspection?
  - Have flood waters damaged the Pipeline?
  - Have flood waters exposed buried piping?
  - Has soil shifted that could lead to a landslide?
- Evaluate the accessibility of pipeline facilities that may be in jeopardy, such as valve settings, which are needed to isolate water crossings or other sections of a pipeline.
- Extend regulator vents and relief stacks above the level of anticipated flooding, as appropriate.
- Coordinate with emergency and spill responders on pipeline location and condition. Provide maps and other relevant information to such responders.
- Coordinate with other pipeline operators in the flood area and establish emergency response centers to act as a liaison for pipeline problems and solutions.
- Deploy personnel so that they will be in position to take emergency actions, such as shutdown, isolation, or containment.
- Determine if facilities that are normally above ground (e.g., valves, regulators, relief sets, etc.) have become submerged and are in danger of being struck by debris.
- Perform frequent patrols, including appropriate overflights, to evaluate right-of-way conditions at water crossings during flooding and after waters subside. Determine if flooding has exposed or undermined pipelines as a result of new river channels cut by the flooding or by erosion or scouring.
- Perform surveys to determine the depth of cover over pipelines and the condition of any exposed pipelines, such as those crossing scour holes. Where appropriate, surveys of underwater pipe should include the use of visual inspection by divers or instrumented detection. Information gathered by these surveys should be shared with affected landowners. Agricultural agencies may help to inform farmers of the potential hazard from reduced cover over pipelines.
- Ensure that line markers are still in place or replaced in a timely manner. Notify contractors, highway departments, and others involved in post-flood restoration activities of the presence of pipelines and the risks posed by reduced cover. If a pipeline has suffered damage, is shut-in, or is being operated at a reduced pressure as a precautionary measure as a result of flooding.

- Advise the appropriate Federal and or Provincial/State pipeline safety authority before returning the line to service, increasing its operating pressure, or otherwise changing its operating status. The appropriate regulatory agencies will review all available information and advise the operator, on a case-by-case basis, whether and to what extent a line can safely be returned to full service.
- Make all necessary repairs.

Tornado/Microburst/Straight Line Winds

Although many disasters cannot be prevented or predicted, preparation can significantly reduce losses. In the event of a severe weather condition or a natural disaster, the Area Manager or assigned designee will be the Emergency Coordinator.

- Be Aware of Changing Weather Conditions
  - Tornado watch - Conditions are right for the formation of a tornado.

  Tornado warning - A tornado has been sighted; take cover immediately.
- If Severe Weather Conditions Threaten
  - Carry a battery operated portable radio and monitor conditions.
  - If a tornado is observed and time permits, evacuate the area.
  - If the tornado is approaching a pump station, notify the Liquids Pipeline Control Center to remotely isolate the station.
  - In vehicle, drive away from tornado at right angle. Get out of car and seek shelter if tornado cannot be avoided.
  - If outdoors, shelter in ditch, excavation or other low spot and lie flat, face down.
  - Make certain that all personnel are aware of the condition.
  - Stay in shelter until conditions are safe.

- Immediately After the Storm
  - Account for all personnel.
  - Survey for damages.
  - Initiate team for any repairs.
  - Refer to this Plan for additional response guidance regarding fires, spills, etc., as needed.

Earthquake

The actual movement of the ground in an earthquake is rarely the direct cause of death or injury. Most casualties result from falling objects and debris because the shocks can shake, damage or demolish buildings and other structures.

- Stay calm. Don't panic.
- If you are indoors, stay there. Do not run outside.
- If you are in a building, take cover under a heavy furniture or stand in an inside doorway away from windows. (A door frame or the inner core of a building is its strongest point and least likely to collapse.)
- Exit building as situation determines.
- If you are outside, stay there. Move away from buildings to avoid falling debris. Avoid damaged utility lines.
- If you are driving, stop quickly and stay in your car. If possible, do not stop on a bridge, overpass or where buildings can fall on you. Your car can provide protection from falling debris.
- Do not reenter damaged buildings. Walls may collapse after the original shaking has ceased.
- Evaluate the situation and initiate appropriate pipeline patrol by the most expedient means possible to determine extent of damage.
- Make all necessary repairs as resources and conditions allow.

Severe Winter Storm

- Be aware of Changing Weather Conditions
  - Winter Storm Watch - Conditions are expected but not imminent.
  - Winter Storm Warning - A significant winter storm is occurring, imminent, or likely.
  - Blizzard Warning - Winds at least 35 mph (56.3km), blowing snow frequently reducing visibility to 0.25 miles (0.40 km) or less, and dangerous wind chills are expected.
- Listen to local radio stations for weather advisory and road condition reports, carry a survival kit, and start the trip with a full tank of gasoline.
- Inspect pump station, equipment, and controls after storm for damage.
- Make any repairs as necessary.

Volcanic Eruptions

If a volcanic eruption ejects a large ash plume and the wind carries the ash to the pipeline facilities, this may cause a disruption of operations by making travel difficult or impossible due to reduced visibility.

- Begin gathering information from news media, field personnel, etc. to assess any ash cloud size, location, heading and speed as soon as news of an eruption breaks.
- Consider recalling crews prior to the expected arrival of the ash cloud while it is still clear to travel. If a crew is at a station when an ash fall begins, they should probably stay there for the duration and not travel until it is determined to be safe after the event.
- Advise contract aerial patrol service of the situation if contacted for the beginning of a pipeline patrol or if an aerial patrol is in progress.
- Inspect pump station, equipment and controls after eruption for damage.
- Make any repairs as necessary.

Security Incidents

For detailed guidance for response to a Security Incident, refer to the following procedures:

- Security Threats Process (CAN-US-MEX)
- Bomb and Sabotage Threat Process (CAN-US-MEX)
- CSO PRO Cybersecurity Incident Response Process (CAN-US-MEX)

Security Threats
1. 2. 3. 4. 5.

Bomb and Sabotage Threat
1. 2. 3. 4. 5. 6. 7.

Cybersecurity Incident
1. 2. 3.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Abnormal Pipeline Operations

If operating design limits have been exceeded (increase or decrease pressure or flow) and no emergency condition exists, document the incident in SAP, immediately investigate the pipeline, and run the event to resolution. Reference Over Pressure Procedure for greater detail.

Liquids Pipelines Control Center potential over pressure operating events and responses are broken down into (2) categories. The events are as follows:

- SCADA Over Pressure Protection Alarm/Trip, coinciding with a SimSuite MOP Alarm.
    - In the event the Pipeline Controller receives a SCADA Over Pressure Protection Alarm/Trip that results in a coinciding SimSuite MOP alarm the Pipeline Controller is to take the following steps:
        - If the pipeline was not shutdown as a result of the SCADA Control Pressure Event, the Pipeline Controller is to shutdown the pipeline and sectionalize in the MOP alarming section as per Pipeline Isolation and Segmentation Procedure.
        - Make notifications as per the Oil Pipelines Notification Procedure.
        - Notify Oil Pipeline Engineering (OPE) On call designate to initiate Overpressure Analysis to determine the if and by how much the pressure exceeded MOP and the mitigation procedures required prior to restart
        - The Pipeline Controller and Leak Detection Specialist are to continue monitoring the shut in pipeline pressures in alarming section looking for any leak triggers until further direction is received FROM OPE.
        - Should the Pipeline Controller or Leak Detection Specialist receive any other leak triggers, the Pipeline Controller will do the following:
        - Make notifications as per the Oil Pipelines Notification Procedure.
- A SimSuite MOP Alarm not coinciding with a SCADA Over Pressure Protection Alarm/Trip.
    - In the event the Pipeline Controller or Leak Detection Specialist receives a SimSuite MOP alarm not coinciding with a SCADA Over Pressure Protection Alarm/Trip, the Leak Detection Specialist is to take the following steps:
        - Start a 20 minute timer
        - Call Leak Detection System Support (2630) and work with Leak Detection System Support and the Pipeline Controller to verify the model is working correctly.
        - If Leak Detection System support reports the alarm is the result of a known or suspected issue with the model, the Leak Detection Specialist will;
        - Trend all mainline pressures in the alarming leak section, one leak section upstream and one leak section downstream and confirm with the Pipeline

Controller that there was no pressure transient that corresponded to the MOP alarm.

- Instruct Leak Detection System Support to initiate an IIT describing their investigation and basis for suspecting an issue with the model.
- Elog and file an IIR as per Section
- Monitor for additional leak triggers
- Should the Pipeline Controller or Leak Detection Specialist receive any other leak triggers, receive the 20 minute reminder alarm or determine that the alarm coincided with a pressure transient, or if the 20 minutes expires before Leak Detection System support can confirm the alarm is the result of a known or suspected issue with the model, the Pipeline Controller will do the following:
- Shutdown the pipeline and sectionalize in the MOP alarming section as per Pipeline Isolation and Segmentation Procedure.
- Make notifications as per the Oil Pipelines Notification Procedure.
- Notify Oil Pipeline Engineering (OPE) On call designate to initiate Overpressure Analysis to determine the if and by how much the pressure exceeded MOP and the mitigation procedures required prior to restart.

- Report
    - Log the event(s) in Elogs and complete an IIR (Initial Incident Response Form)

- Verify whether a true safety problem, equipment malfunction, or operator error is present. In all cases, safety to operations, the general public, and property will govern actions taken.
- Make appropriate repairs before continuing operations. Corrective action will only be done by qualified personnel to perform the type of work involved.
- Monitor affected systems until normal operations are resumed.
- Complete follow-up and written reporting, as the situation demands.

Liquids Pipelines Control Center

- Follow training and LPCC procedures to respond to any Abnormal Operating Conditions while coordinating any inspection work as per the O&M manual with support from Oil Pipelines Engineering and Field Operations.

!	**NOTE:** It is the responsibility of the pipeline operator to carry out the response procedures for abnormal pipeline operations as outlined in their respective O&M Manual (EDMS ID: 005713585). If Abnormal Operations occur in the US, refer to O&M manual, procedure 195.402d. If MOP is exceeded on any current Liquids Pipeline it will be shutdown and Isolated.

Entrained Oil in Soil

All Roles

The following actions should be followed in order to control a release of crude oil into soil. Time is of the essence in any release, in this scenario, removal of the released oil will prevent further downward and outward migration of the oil.

1. Eliminate the source of the oil through isolation of the pipeline or other means.
2. Remove any free oil from the soils:
    - Vacuum trucks can be utilized for the removal of any free oil
    - Absorbents can be used to collect smaller quantities of free oil
3. Excavation of the impacted material
    - As able, remove the most heavily impacted materials first, this will minimize migration
    - Mechanical excavation may be used to remove impacted soils
    - Hydrovac's may be effective in situations in close proximity to underground features or access constraints. Consideration should be given to a Hydrovac creates spoils that are more difficult to store and dispose.
4. Properly store recovered and excavated materials
    - Impacted solids should be stored in roll off type containers or if larger quantities are generated, stockpiles may be used. Line the bottom of any stockpiles with a minimum of 10 mil plastic and cover stockpiles when not actively working the pile.

Recovered liquids should be stored in appropriate containers on secondary containment. High oil content liquids should be segregated from low oil content (high water content) liquids.

Release to Groundwater

All Roles

The following procedure has been prepared in the event of a release of crude oil from the pipeline into a hydraulically sensitive groundwater resource area but may not be currently identified as a high consequence area by PHMSA.

During the emergency response (and interim response) stages of an event, focus will be on remedial approaches that can be deployed for the immediate removal of crude oil. There will be at least two major phases to the spill response:

- Emergency Response - to control and eliminate the immediate risks associated with the oil release to environment and human health, and
- Interim Response - immediate cleanup of the residual petroleum hydrocarbon impacts in various media when threats are present, but do not pose an immediate risk.

The key to minimizing potential impacts to groundwater is prompt removal of free oil and impacted soils in the area of the release. In the event free phase crude oil impacts groundwater:

1. Control the source of the crude on groundwater by removing the source material as described in "Entrained Oil in Soil".
2. If Light Non-Aqueous Phase Petroleum Liquids (LNAPL) are floating on the groundwater
    a. Source material removal may have created a location where groundwater is exposed. Use vacuum trucks to collect the LNAPL
    b. Direct push technology may be used to create boreholes that can identify the extent of the oil on groundwater. These boreholes may also be used with small pumps to remove LNAPL
    c. With shallow groundwater, mechanical excavation can be utilized to create sumps to collect free oil with removal with vacuum trucks and absorbent materials as well as to determine the extent of the oil released
    d. Larger boreholes may be created with flighted auger equipment such as excavator attachments and drill rigs

Hurricane

Preparatory and response activities for hurricanes are guided by plans maintained separate from this plan. The actions below are drawn from these separate plans, and only guide actions of Field Operations. Decision making in preparation and response to a hurricane affecting TC Energy facilities will be made by the Houston/Hurricane Incident Support Team.

Action Plan
For detailed guidance for response to a hurricane, refer to the following Plan/Hurricane Storm Classifications: USLFO Hurricane Preparedness & Response Plan

STORM CLASSIFICATION	
ALERT	Tropical weather system entering or predicted to form in the Gulf of Mexico with the potential to impact USLFO assets.
PHASE 1	Hurricane or tropical weather system is forecasted to impact USLFO assets within 96 hours.
PHASE 2	Hurricane or tropical winds are within 72 hours of Gulf Coast landfall and includes USLFO assets.
PHASE 3	Hurricane is within 48 hours of Gulf Coast landfall and includes USLFO assets. Also includes the period of time of direct impact of the storm until its passage.
PHASE 4	Hurricane is within 24 hours of USLFO assets and includes the period of time of the direct impact of the storm until its passage.
RECOVERY	Hurricane has passed USLFO assets and sustained winds fall below 39 MPH

3.4 Documentation of Initial Response Actions

It is difficult, particularly during the first few minutes of an initial response operation, to think about the importance of documentation. A log should be maintained which documents the history of the events and communications that occur during the response. When recording this information, it is important to remember that the log may become instrumental in legal proceedings, therefore:

- Record only facts, do not speculate.
- Do not criticize the efforts and/or methods of other people/operations.
- Do not speculate on the cause of the spill.
- Do not skip lines between entries or make erasures. If an error is made, draw a line through it, add the correct entry above or below it, and initial the change.
- Record the recommendations, instructions, and actions taken by government/regulatory officials.
- Document conversations (telephone or in person) with government/regulatory officials.
- Request that government/regulatory officials document and sign their recommendations or orders (especially if company personnel do not agree with the suggestions, instructions, or actions).

3.5 Oil Containment, Recovery and Disposal/Waste Management

After initial response has been taken to stop further spillage and notifications made to the required agencies, the Company will begin spill containment, recovery, and disposal operations.

The Incident Commander will assess the size and hazards of the spill (see Figure 3.2). The type of product, the location of the spill, and the predicted movement of the spill will be considered.

See Appendix H, Basics of Oil Spill Response, for additional information on oil containment removal.

Based on this assessment, additional clean-up personnel and equipment will be dispatched to the site and deployed to control and contain the spill. Boom may be deployed in waterways to contain the spill and to protect socio-economic and environmentally sensitive areas. Booms may also be used in waterways to deflect or guide the spill to locations where it can more effectively be cleaned up using skimmers, vacuum trucks, or sorbent material. Clean-up equipment and material will be used in the manner most effective for rapid and complete clean-up of all spilled product. It will likely be necessary to implement stopple isolation in order to achieve full containment, otherwise the gravity drainage of oil will continue to recharge the rupture hole and drive the oil down the ditch line. Over time, and depending on topography, these volumes migrating below ground may materially impact the reportable release volume and the cleanup costs.

Response and clean-up will continue until all recoverable product is removed, the environment is returned to its pre-spill state. In the event the response was managed fully within TC Energy, the Incident Commander must determine that response endpoints have been met and response/cleanup is no longer necessary. In the event responding organizations (inclusive of TC Energy) has managed the

response under a Unified Command, then all respective commanders must determine that response endpoints have been met and response/cleanup is no longer necessary.

See Appendix H, Basics of Oil Spill Response, for additional information on oil containment recovery.

Figure 3.2 Product Specific Response Considerations

GUIDE 128 Flammable Liquids (Non-Polar/Water-Immiscible)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.

- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a (P) may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.
- Substance may be transported hot.
- For UN3166, if Lithium ion batteries are involved, also consult GUIDE 147
- If molten aluminum is involved, refer to GUIDE 169.

HEALTH

- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

GUIDE 128 Flammable Liquids (Non-Polar/Water-Immiscible)

EMERGENCY RESPONSE

FIRE

- CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.
- CAUTION: For mixtures containing alcohol or polar solvent, alcohol-resistant foam may be more effective.

Small Fire

- Dry chemical, CO2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam. Do not use straight streams.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing, and administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

3.6 Storage/Disposal

Strict rules designed to ensure safe and secure handling of waste materials govern the Company waste disposal activities. To ensure proper disposal of recovered oil and associated debris, the following guidelines should be considered:

- In the event of a product spill, Facilities have limited capacity to store recovered product and water. Separated product is pumped to frac tanks or to trucks to be carried to the Facility for processing.
- Oily debris will be segregated on site and containerized for temporary storage prior to disposal in accordance with hazardous waste regulations.
- Transportation of waste material will be performed in accordance with all applicable Federal and State Regulations.
- Waste associated with the spill will be disposed at sites that have the necessary permits to accept the type of waste to be discharged.

The Company's Community, Safety and Health Administration Dept. will coordinate activities and secure the permits to ensure proper disposal or recycling of recovered product and debris.

3.7 Sampling and Waste Analysis Procedures

The Company's sampling and waste analysis practices are governed by the regulations for the applicable Province/State and Federal agency. These regulations outline methods and procedures for determining the chemical and physical characteristics of wastes generated by the Facility, including waste associated with spills, so that they may be properly stored, treated, or disposed.

4 RESPONSE TEAMS

4.1 Introduction

This Section describes organizational features and duties of the local responders, the Regional Emergency Preparedness Team (EPT), and the Emergency Management Team (EMT) as defined in TC Energy's Emergency Management Corporate Program Manual.

The key to an effective emergency response is a rapid, coordinated, tiered response by the affected Facility, the Regional Emergency Operations Center, and the Corporate Emergency Operations Center, consistent with the magnitude of an incident.

First response to an incident at a Facility and or a ROW will be provided by the local responders. The Regional EOC will respond, to the degree necessary, to incidents exceeding local capability.

TC Energy's response teams use the Incident Command System (ICS) to manage the emergency response activities. Because Incident Command System is a management tool that is readily adaptable to incidents of varying magnitude, it will typically be used for all emergency incidents. Staffing levels will be adjusted to meet specific response team needs based on incident size, severity, and type of emergency.

An explanation of Incident Command System and the roles and responsibilities for primary members of the response teams are provided in Section 4.7. The United States Coast Guard (USCG) Incident Management Handbook (IMH) contains an in-depth description of all Incident Command System positions, Incident Command System development, response objectives and strategies, command responsibilities, Incident Command System specific glossary/acronyms, resource typing, the Incident Action Plan process, and meetings. The IMH can be located on the USCG's Homeport Website. Additionally, TC Energy IMHs have been provided by The Response Group for use during emergencies and exercises as well.

4.2 Qualified Individual

It is the responsibility of the Qualified Individual (QI) or his/her designee to coordinate with the Federal On-Scene Coordinator (FOSC) and State On-Scene Coordinator (SOSC) in the US or Provincial On-Scene Coordinator (POSC) in Canada throughout the response, if applicable.

Vital duties of the Qualified Individual (QI) include:

- Notify all response personnel, as needed.
- Identify the character, exact source, amount, and extent of the release, as well as the other items needed for notification.
- Assess the interaction of the spilled substance with water and/or other substances stored at the Facility and notify response personnel at the scene of that assessment.
- Assess the possible hazards to human health and the environment due to the release. This assessment must consider both the direct and indirect effects of the release (i.e., the effects of

any toxic, irritating, or asphyxiating gases that may be generated, or the effects of any hazardous surface water runoffs from water or chemical agents used to control fire and heat-induced explosion).
- Assess and implement prompt removal actions to contain and remove the substance released.
- Coordinate rescue and response actions as previously arranged with all response personnel.
- Activate and engage in contracting with oil spill removal organizations.
- Use authority to immediately access Company funding to initiate cleanup activities.
- Direct cleanup activities until properly relieved of this responsibility.
- Arrangements will be made to ensure that the Qualified Individual (QI) is available on a 24-hour basis and is able to arrive at the Facility in a reasonable time.
- The Plan takes in account 40 CFR 262.261 (d) for the qualified individual to act as the emergency coordinator. Qualified individuals are identified by name in the plan.

4.3 Initial Response Team

The first TC Energy representative on scene will function as the Company First Responder until relieved by an authorized individual who will assume the Incident Commander (IC) role. The role of IC will typically be assumed and retained by area management as appropriate.

The TC Energy Company First Responder will inherently be tasked with evaluating the scope of the emergency to determine the resource needs for the response. At any point during the initial scene size-up, the TC Energy Company First Responder is empowered to request additional response teams to support response efforts. This response team may come in one of two forms:
- Activation of local company resources to support Site Managed Emergencies.
- Deployment of an Incident Management Team to support the emergency.

The number of positions/personnel required to staff the Incident Management Team will depend on the size and complexity of the incident. The duties of each position may be performed by the IC directly or delegated as the situation demands. The IC is always responsible for directing the response activities and will assume the duties of all the primary positions until the duties can be delegated to other qualified personnel. In the event of personnel attrition and fatigue management, the Corporate Incident Management Assistance Team may be activated to staff Incident Management Team roles as support if needed.

A complete functional ICS organization is shown in Figure 4.1. The Incident Commander should try to fill the necessary positions within the Incident Management Team and request additional support from both the Regional and Corporate Emergency Operations Centers to fill/back up all the positions as the incident may dictate. Detailed job descriptions of the primary response team positions are provided in Section 4.9.

4.4 Regional Emergency Operations Center (REOC)

The On-Call Manager / Area Manager will activate a Regional Emergency Operations Center (EOC) to support the Initial Incident Management Team as needed. The number of positions/personnel required to staff the Regional EOC will depend on the size and complexity of the incident.

The Regional EOC is staffed by personnel from various Regional locations. The Regional EOC provides necessary information to the appropriate Federal, State/Province, and Local authorities with designated response roles, including the National Response Center (NRC), the Canada Energy Regulator (CER), if necessary, State Emergency Response Commission (SERC) Provincial Ministry, and local response agencies as appropriate.

4.5 Corporate Emergency Operations Center (CEOC)

TC Energy recognizes Corporate EOCs; one in each country of operations:

- Canada Corporate EOC, located at the TC Energy Corporate Headquarters in Calgary, AB
- US Corporate EOC, located at the TCEC Center Building in Houston, TX
- Mexico Tiered EOC, located at the TC Energy Office in Mexico City, Mexico

The Canada Corporate EOC is the primary Corporate EOC for Keystone Pipeline System emergencies. However, the US Corporate EOC may support a Keystone Pipeline System emergency if the primary hazard is a hurricane.

If the Corporate EOC Manager deems it necessary to establish a physical EOC, the following describes the actions to be conducted at the facility. The Corporate EOC manager may determine a virtual EOC is adequate, and the same actions should be completed from remote locations.

As requested by the Incident Management Team or Regional EOC, the Corporate EOC provides:

- Overall incident support coordination
- Operational and procedural support

The Corporate EOC Manager facilitates discussion within the EOC and ensures the proper resources are available to address the emergency with consultation of respective support departments. Each department will determine the extent of their necessary involvement in the emergency and be prepared to respond. Not all roles may be activated for any given emergency. The Corporate EOC may provide support to the Regional EOC or Incident Management Team by completing external notifications and proposing strategies for response.

4.6 Incident Support Team (IST)

Senior management should be engaged during all significant events and emergencies that occur in TC Energy to support the response. This may take place simultaneously with the activation of the EOC, though may also take place in events which do not activate the EOCs. In all emergency events the on-site Incident Commander has the authority to make all decisions related to the event. Senior Management can help provide direction and establish priorities as necessary, but the Incident

Commander (or Unified command) leads the response efforts. When senior leadership is involved for this purpose, the group is identified as an Incident Support Team (IST).

4.7 Incident Command System (ICS)

The Incident Command System is intended to be used as an emergency management system to manage all types of emergency incidents. This system is readily adaptable to very small emergency incidents as well as more significant or complex emergencies. The Incident Command System utilizes the following criteria as key operational factors:

- Assigns overall authority to one individual.
- Provides structured authority, roles and responsibilities during emergencies.
- The system is simple, familiar and is used routinely at a variety of incidents.
- Communications are structured.
- There is a structured system for response and assignment of resources.
- The system provides for expansion, escalation, and transfer/transition of roles and responsibilities.
- The system allows for "Unified Command" where agency involvement at the command level is required.

Effective establishment and utilization of the Incident Command System during response to all types of emergencies can:

- Provide for increased safety.
- Shorten emergency mitigation time by providing more effective and organized mitigation.
- Cause increased confidence and support from local, State, Federal, and public sector emergency response personnel.
- Provide a solid cornerstone for emergency planning efforts.

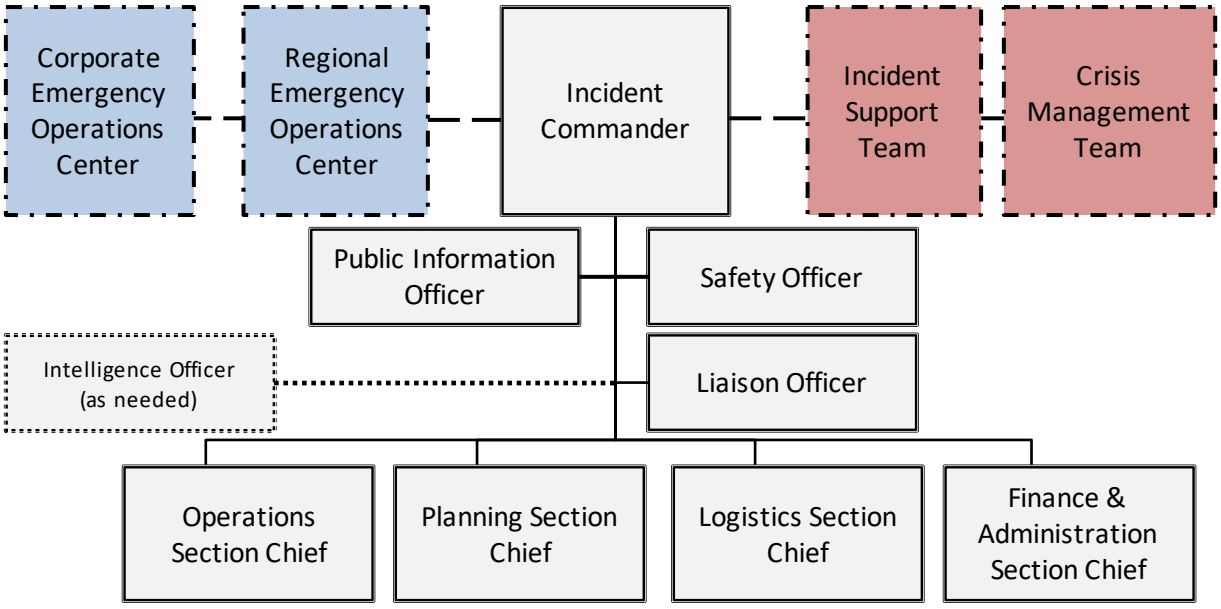
4.8 Unified Command

In the Incident Command System, a Unified Command (UC) is an authority structure in which the role of Incident Commander is shared by two or more individuals (inclusive of TC Energy), each already having authority in a different responding organization/agency. Unified Command is one way to carry out command in which responding organizations/agencies and/or jurisdictions with responsibility for the incident share incident management.
A UC may be needed for incidents involving multiple jurisdictions or agencies.
If a UC is needed, Incident Commanders representing responding organizations/agencies or jurisdictions that share responsibility for the incident, manage the response from a single incident command post. A UC allows agencies with different legal, geographic, functional authorities and responsibilities to work together effectively without affecting individual organization/agency authority, responsibility, or accountability. Under a UC, a single, coordinated incident action plan will direct all activities. The Incident Commanders will supervise a single command and general staff organization and speak with one voice.
Unified Command representatives must be able to:

- Agree on common incident objectives and priorities.

- Have the capability to sustain a 24-hour-7-day-per-week commitment to the incident.
- Have the authority to commit agency or Company resources to the incident.
- Have the authority to spend agency or Company funds.
- Agree on an incident response organization.
- Agree on the appropriate Command and General Staff assignments.
- Commit to speak with "one voice" through the Public Information Officer or Joint Information Center.
- Agree on logistical support procedures.
- Agree on cost-sharing procedures.

Figure 4.1 Incident Command System



4.9 ICS Roles and Responsibilities

Specific roles and responsibilities of the ICS positions are prescribed through the ICS Role Checklists, available to all TC Energy staff through the Emergency Management 1TC Website. Personnel within the ICS structure may use these checklists to guide their response actions. The paragraphs below provides a summary of each role, but do not prescribe actions. Not all roles are required to be staffed in every emergency; however, when roles are not staffed, the responsibilities of unstaffed roles must be completed by other personnel.

Company First Responder

The first official TC Energy representative arriving at an emergency site and is the initial TC Energy Incient Commander. This mandatory initial position allows for one individual to assume command and

control of an emergency stuation until and activate appropriate TC Energy Emergency Response structures.

Command Staff Roles and Responsibilities

Incident Commander

The Incident Commander has responsibility for overall management of an incident; specific functions are established to support the Incident Commander. These specific roles fill Officer positions within ICS; collectively, the Incident Commander and all Officers comprise the Command Staff.

At TC Energy, the Incident Commander who relieves the company first responder may be an Incident Commander trained area or facility manager. Though, may also be a TC Energy individual that is not a supervisor, but is Incident Commander trained. He/she may be assisted by a deputy IC (s). As the incident progresses, the IC may be relieved by other Incident Commander trained personnel. It is not recommended that command be assumed by levels higher than Director, in order to ensure availability of senior leaders to maintain broader organizational roles during emergencies. For example, Vice Presidents of an affected business unit automatically retain the role of IST Leader. They may serve in that policy and goal-setting capacity directly on-site, working in conjunction with the Incident Commander.

The Deputy IC must have the same qualifications as the person for whom they work, as they must be ready to take over that position at any time. When span of control becomes an issue for the IC, a Deputy IC may be assigned to manage the Command (or other) Staff.

Safety Officer

The Safety Officer (SOFR) function is to develop and recommend measures for assuring personnel safety and to assess and/or anticipate hazardous and unsafe situations. Only one primary SOFR will be assigned for each incident. The SOFR may have assistants, as necessary, and the assistants may also represent assisting agencies or jurisdictions. Safety assistants may have specific responsibilities, such as air operations, hazardous materials, etc.

Public Information Officer

The Public Information Officer (PIO) is responsible for developing and releasing information about the incident to the news/media, to incident personnel, and to other appropriate agencies and organizations. Only one primary PIO will be assigned for each incident, including incidents operating under Unified Command (UC) and multi-jurisdiction incidents. The PIO may have assistants as necessary, and the assistants may also represent assisting agencies or jurisdictions.

Liaison Officer

The Liaison Officer (LNO) position shall be staffed in all instances where there are agencies or groups requiring representation or information sharing, though have not joined the Unified Command (if

established). Only one primary LNO will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdiction incidents. The LNO may have assistants as necessary, and the assistants may also represent assisting agencies or jurisdictions.

The LNO is assigned to the incident to be the contact for assisting and/or cooperating Agency Representatives. The LNO differs from the PIO role where the LNO works with governmental representatives, leaders from affected agencies and jurisdictions. The LNO is the Incident Management Team member responsible for coordinating information sharing with all impacted agencies and groups; this includes landowners, rights-holder communities, homeowner associations, and municipalities.

Intelligence Officer

The Intelligence Officer (INTO) is to provide the organization intelligence information that can have a direct impact on the safety of response personnel and influence the disposition of security assets involved in a response. Not all responses will require the need to staff an INTO, those that do, will be handled on a case by case basis.

General Staff Roles and Responsibilities

The remaining four major management activities (Operations, Planning, Logistics, and Finance/Administration) are referred to as Sections within ICS, and the leaders of these sections are called Section Chiefs.

Operations Section

The Operations Section is responsible for the management of all tactical operations directly applicable to the primary mission. The Operations Section is responsible to execute tactics in the Incident Action Plan. The leader of the Operations Section is called the Operations Section Chief (OSC). The OSC has the following specific responsibilities:

- directs the preparation of operational plans;
- requests or releases resources,
- monitors operational progress, and
- makes expedient changes to the IAP, as necessary

The OSC may have Deputy OSC's, who may be from TC Energy or may be from an assisting agency. The Deputy OSC shall have the same qualifications as the person for whom they work, as they must be ready to take over that position at any time.

In complex incidents, the OSC may assign a Deputy OSC to supervise on- scene operations while the OSC participates in the incident planning process.

An Operations Section Chief may assign the following roles within the Operations Section to build a more robust team to meet the demands of the incident:

- Staging Area Manager establishes staging area for resources brought to the site, determines any additional needs for equipment, feeding, sanitation and security, establish check-ins, traffic control areas, obtain and issues receipts for supplies distributed and received.
- Air Operations Branch Director organizes air operations, request/declare restricted air space, air traffic control requirements, supervise all air operations, and coordinate with Federal Aviation Authorities – role kit will be managed by Corporate Aviation.
- Other Branch Directors and Divisions, Groups, Strike Teams, Task Forces and Segments as needed.

Planning Section

The Planning Section is responsible for the collection, evaluation, dissemination and use of incident information and maintaining status of assigned resources. Incident information has many uses, a few listed as follows:

- Communicate the status of the current situation.
- Predict the probable course of incident events.
- Prepare strategies, plans and alternative strategies and plans for the incident.
- Submit required incident status reports.

The leader of the Planning Section is the Planning Section Chief (PSC). The PSC may have Deputy PSC's, who may be from TC Energy or may be from an assisting agency. The Deputy PSC shall have the same qualifications as the person for whom they work, as they must be ready to take over that position at any time.

A Planning Section Chief may assign the following roles within the Planning Section to build a more robust team to meet the demands of the incident:

- Documentation Unit Leader provides duplication services, including written Incident Action Plans. Maintains and archives all incident-related documentation.
- Demobilization Unit Leader assists in ensuring that resources are released from the incident in an orderly, safe, and cost-effective manner.
- Resource Unit Leader is responsible to ensure that all assigned personnel and resources have checked in at the incident. Resources consist of personnel, teams, crews, aircraft, and equipment available for assignment to or employment during an incident. The Resources Unit maintains a system for keeping track of the current location and status of all assigned resources and maintains a master list of all resources committed to incident operations.
- Situation Unit Leader is responsible for collecting, processing, and organizing ongoing situation information; prepares situation summaries; and develops projections and forecasts of future events related to the incident. The Situation Unit prepares maps as well as gathers and disseminates information and intelligence for use in the Incident Action Plan (IAP). This Unit shall be prepared to provide timely situation reports as scheduled or at the request of the Planning Section Chief or IC.
- Field Observer is responsible for collecting situational information from personal observations at the incident and provides this information to the Situation Unit Leader.
- Environmental Unit Leader is responsible for managing all environmental matters associated with incident response operations, including: environmental assessment; permitting; modeling and surveillance; environmental monitoring and damage assessment; sensitive habitat, wildlife protection and rehabilitation. Additionally, the leader is responsible for providing technical advice to the Operations Section on activities including waste disposal and alternative technologies (in situ burning, dispersant use) and for developing remediation and restoration plans. This Unit may also require the expertise of technical specialists.
- Technical Specialists have specialized knowledge and expertise. Technical Specialists may function within the Planning Section or be assigned wherever their services are required.

Logistics Section

The Logistics Section is responsible for providing facilities, services, and material in support of the incident. The leader of the Logistics Section is the Logistics Section Chief (LSC). The LSC participates in the development and implementation of the IAP and activates and supervises the Branches and Units within the Logistics Section. The LSC may have Deputy LSC's, who may be from TC Energy or may be

from an assisting agency. The Deputy LSC shall have the same qualifications as the person for whom they work, as they must be ready to take over that position at any time.

A Logistics Section Chief may assign the following roles within the Logistics Section to build a more robust team to meet the demands of the incident:

- Communications Unit Leader prepares and implements the Incident Communication Plan, distributes and maintains communications equipment, supervises the Incident Communications Center and establishes adequate communications over the incident.
- Medical Unit Leader provides first aid and light medical treatment for personnel assigned to the incident and prepares procedures for a major medical emergency; this role filled by third party Emergency Medical Services in most incidents.
- Food Unit Leader responsible for providing meals and drinking water for incident personnel and obtains the necessary equipment and supplies to operate food service facilities at the incident base.
- Facilities Unit Leader sets up and maintains incident facilities, responsible for facility security and facility services (sanitation, lighting, and cleanup).
- Security Manager organizes site security, secures the incident site and perimeter, maintains an entry/exit log off all visitors, works with local Policing authorities, maintains a list of authorized personnel attending the emergency site, and provides direction to contract security deployed to the site.
- Ground Support Unit Leader prepares the Transportation Plan. Arranges for, activates, and documents the fueling/maintenance of assigned ground transportation, and arranges for the transportation of personnel, supplies, food, and equipment.
- Supply Unit Leader determines the amount of supplies needed to support the incident. Responsible for ordering, receiving, storing and distributing supplies, services and nonexpendable equipment. All resource requests are placed through this unit and the unit maintains inventory and accountability of supplies and equipment.

Finance/Administration Section

The Finance/Administration Section is responsible for all financial, administrative and cost analysis aspects of the incident. The leader of the Finance/Administration Section is Finance Section Chief (FSC). The FSC is responsible for supervising members of the Finance/Administration Section. The FSC may have Deputy FSC's, who may be from TC Energy or may come from an assisting agency. The Deputy FSC shall have the same qualifications as the person for whom they work, as they must be ready to take over that position at any time.

A Finance/Administration Section Chief may assign the following roles within the Finance/Administration Section to build a more robust team to meet the demands of the incident:

- Cost Unit Leader provides cost analysis data for the incident. This Unit must ensure that equipment and personnel for which payment is required are properly identified, obtain and

record all cost data, and analyze and prepare estimates of incident costs. The Cost Unit also provides input on cost estimates for resource use to the Planning Section. The Cost Unit shall maintain accurate information on the actual costs of all assigned resources.

- Compensation Claims Unit Leader is responsible for handling injury compensation and claims.
- Procurement Unit Leader is responsible for financial matters involving vendor contracts.
- Time Unit Leader is responsible for recording time for incident personnel and hired equipment.

Figure 4.2 Operational Planning P

5 RESPONSE PLANNING

5.1 Incident Action Plan

Emergency response activities are planned and coordinated using an Incident Action Plan (IAP), which is developed for each Operational Period of a response following the tactial planning process. For small responses, an ICS 201 may be used as the IAP and, for all incidents, the ICS 201 will serve as the initial IAP.

For larger or more complex incidents, a more complete IAP will be necessary. These IAPs are generally created through the completion and compilation of standard Incident Command System forms. These forms may include, but are not limited to:

ICS FORM	FORM TITLE	PREPARED BY
IAP Cover Sheet-CG	IAP Cover Sheet	Planning Section - Situation Unit Leader
201-CG (TC)	Incident Briefing	Command Section - Initial Incident Commander
202-OS	Incident Objectives	Planning Section - Planning Section Chief/Incident Commander
203-CG	Organization Assignment List	Planning Section - Resource Unit Leader
204-OS	Assignment List	Operations Section - Chief & Resource Unit Leader
204a-OS	Assignment List Attachment	Operations Section - Chief & Resource Unit Leader
205-OS	Incident Radio Communication Plan	Logistics Section - Communication Unit Leader
205a-OS	Communications List	Logistics Section - Communication Unit Leader
206-OS	Medical Plan	Logistics Section - Medical Unit Leader
207-OS	Incident Organization Chart	Planning Section - Resource Unit Leader
220-OS	Air Operations Summary	Operations Section - Air Operations Branch Director
230-OS	Daily Meeting Schedule	Planning Section – Planning Section Chief
232-OS	Resources at Risk Summary	Planning Section - Environmental Unit Leader
208	Site Safety Plan	Command Section - Safety Officer

Depending on the nature and severity of the emergency, additional documents may be included in the Incident Action Plan. These may include:

- Sensitivity Maps
- Waste Management and Disposal Plans
- Plans for use of Alternative Technologies (Dispersant/In-situ Burning/ Bioremediation)
- Security Plans
- Decontamination Plans
- Traffic Plans

5.2 Site Safety Plan

Site Safety Plans (SSPs) are required by United States Occupational Safety and Health Administration (29 CFR 1910.120(b)(4)) for all hazardous waste operations. The Site Safety Plan should address all on-site operations and hazardous as well as on-site emergency procedures.

The Site Safety Plan is typically prepared by the Safety Officer and approved by the Incident Commander. All personnel must be familiar with the contents of the Site Safety Plan and the Site Safety Plan must be updated as conditions, operations and hazards associated with the response change.

6 SPILL IMPACT CONSIDERATIONS

6.1 Critical Areas to Protect

The critical areas to protect are classified as high, moderate, and low sensitivity to oil for non-coastal/inland environments. The Federal, Province/State, and Local authorities will further clarify these categories at the time of the response. The categories are defined as follows:

High Sensitivity
• Areas which are high in productivity, abundant in many species, extremely sensitive, difficult to rehabilitate, or inhabited by threatened/endangered species. • Areas which consist of populated areas, rural water systems, well head or source water protection areas or drinking water wells. • Areas which consist of forested areas, brush/grassy areas, wooded lake areas, freshwater marshes, wildlife sanctuaries/refuges, and vegetated river/stream banks.
Moderate Sensitivity
• Areas of moderate productivity, somewhat resistant to the effects of oiling. • Areas which consist of degraded marsh habitat, clay/silt banks with vegetated margins, and gravel/cobble beaches.
Low Sensitivity
• Areas of low productivity, man-made structures, and/or high energy. • Areas which consist of gravel, sand, or clay material, barren/rocky riverbanks and lake edges, man-made structures, and concrete/compacted earthen drainage ditches.

6.2 Environmental/Socio-Economic Sensitivities

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

It is important to protect archeological sites and heritage resources (e.g. National Parks, National Marine Conservation Areas, and National Historic Sites). Impacted archeological sites or heritage resources of an area need to be identified and the likely impacts that result from the activities should be addressed. Specific consideration should be given to access to, and general use and disturbance of areas. The assessment should consider both direct and indirect impacts, cultural protocols and strategies for minimizing impacts. Consultation with local indigenous communities should occur as part of the planning process.

The Company will explore, where appropriate, equivalent environmental protection systems, methods, devices, or technologies that maintain or may be less damaging to the character of heritage resources or

archeological sites. If a release from the pipeline impacts a heritage resource, the Company will respond as outlined in Section 3.0, report to the appropriate authority prescribed by law, cleanup and restore the area as required by regulation, and conduct such sampling, analyses, or associated monitoring during and after restoration.

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

- Canadian Department of Fisheries and Oceans or Environment Canada, U.S. Fish and Wildlife Service and related province/ state agencies;
- Applicable Area Contingency Plans;
- Other industry and private experts; and
- Indigenous groups.

The environmental and socio-economic sensitivities in the vicinity of the Pipeline have been broken down into specific categories and identified in this Section. To further clarify the location of the sensitive areas of concern, references to published Area Contingency Plans and Environmental Sensitivity Maps are also provided in this section.

6.3 Fisheries and Wildlife Protection

The Company will work with Federal, Province/State, and local agency personnel to provide labor and transportation to retrieve, clean, and rehabilitate birds and wildlife affected by an oil spill, as necessary. Oversight of the Company's wildlife preservation activities and coordination with Federal, Province/State, and Local agencies during an oil spill is the responsibility of the Incident Commander.

Protecting fish habitat (e.g. spawning and rearing grounds) is important to both consumers and commercial fisheries. Beyond typical response strategies, other options could include moving floating facilities, temporarily sinking facilities using cages designed for this purpose, temporary suspension of water intakes, or closing sluice gates to isolate the facilities from contamination.

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

Wildlife Rescue

The Company will work with Federal, Province/State, and Local agency personnel to provide labor and transportation to retrieve, clean, and rehabilitate wildlife affected by an oil spill, as the situation demands.
The following are conideration for wildlife rescue and rehabilitation during a response:

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

Search and Rescue - Points to consider

- The Company's involvement should be limited to offering assistance as needed or requested by the agencies.
- Prior to initiating any organized search and rescue, authorization must be obtained from the appropriate Federal/State agency.
- Initial search and rescue efforts, if needed, should be left up to the appropriate agencies. They have the personnel, equipment, and training to immediately begin capturing contaminated wildlife.
- With or without authorization, it must be anticipated that volunteer citizens will aid distressed/contaminated wildlife on their own. It is important to communicate that it may be illegal to handle wildlife without express authority from appropriate agencies. Provisions should be made to support an appropriate rehabilitator; however, no support should be given to any unauthorized volunteer rescue efforts.
- The regulatory agencies and response personnel should be provided the name and location of a qualified rehabilitator in the event contaminated wildlife is captured.
- Resources and contacts that can assist with wildlife rescue and rehabilitation are provided in Section 2.0. This list includes: Outside rehabilitation organizations; Local regulatory agencies; and Other resources.

6.4 Staging Areas

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

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

6.5 Containment and Recovery of Spilled Product

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

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

Spill on Land / Source Control

- Containment Methods
  After safety, the highest priority for TC Energy during a spill response is to prevent product from reaching water and mitigate migration of oil out of the source area. To accomplish this there are many ways to contain or deflect product. Product can be trapped in ditches and gullies by earthen dams. Where excavating machinery is available, dams can be bulldozed to contain lakes of product. Dams, small and large, should be effectively employed to protect priority areas such as inlets to drains, sewers, ducts and watercourses. These can be constructed of earth, sandbags, absorbents, planks, pillow (inflatable with air/water) dams or any other effective method. If time does not permit a large dam, many small ones can be made, each one holding a portion of the spill as it advances. The terrain will dictate the placement of the dams. If the spill is minor, natural dams or earth absorption will usually stop the product before it advances a significant distance. Cleanup is the main concern in such situations.
  Whenever possible, potential routes of migration should be closed off using sandbags, planks, earth or other dams. This is used as a preventative measure in case precipitation begins and the product starts to migrate.
  In urban locations such as city streets or concrete drainage ditches, a combination of sorbent booms in front with a layer sandbags behind holding the boom in place can be used as a very effective means to create containment along with some collection.
  Instead of building up dikes and dams, another method of containment is to dig collection pits. By creating a new low point for the oil to run it provides an excellent recovery point for removal.

- Removal Methods
  The best approaches to remove oil from urban infrastructure includes:
    Removal with suction equipment to a tank truck if concentrated in volumes large enough to be picked up. Channels can be formed to drain pools of product into storage pits. The suction equipment can then be used.

Small areas can be cleaned by hand. Use of sorbent pads to soak up the oil is the preferred method.

If safe, controlled burning presents the possibility of a fast, simple, and inexpensive method of destruction of the remainder of the product. If all other options have been executed and the site is still unsafe for further activity because explosive vapors persist, the vapors may need to be intentionally ignited to prevent an accumulation sufficient to become an explosive mixture, provided the other requirements of these guidelines for controlled burning are met.

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

Other steps and procedures have been executed and a determination has been made that this is the safest remaining method of control.

Intentional burning will not unduly damage pipelines, adjacent property, or the environment.

Controlled burning is permitted by Federal and State/Provincial government authorities. Local government authorities to be contacted may include city council, county board of commissioners, city or county fire chiefs, the county forestry commission or fire tower, and the local environmental protection agency. In seeking permission from these authorities, be prepared to convince them that adequate safety precautions have been and will be taken during the operation. Also be ready to conduct water or soil sampling upon completion as may be required.

Controlled burning is conducted with the consent of local landowners.

Safety must always be a prime consideration when considering controlled burning of product. Sparks and heat radiation from large fires can start secondary fires and strong winds make fire control difficult. There must be no danger of the fire spreading beyond control limits. All persons must be at a safe distance from the edge of the inflammable area. Remember that all burning must be controlled burning.

Spill on Lake or Pond (Calm or Slow-Moving Water)

- Containment Methods
  A lake or pond offers the best conditions for removal of product from water. Although the removal is no easy task, the lake or pond presents the favorable conditions of low or no current and low or no waves.
  The movement of product on a lake or pond is influenced mainly by wind. The product will tend to concentrate on one shore, bank or inlet. Booms should be set up immediately to hold the product in the confined area in the event of a change in wind direction.
  If the spill does not concentrate itself on or near a shore (no wind effect), then a sweeping action using boats and floating booms will be necessary.
  The essential requirement for this operation is that it be done very slowly. The booms should be moved at not more than 40 feet per minute. Once the slick is moved to a more convenient location (near shore), the normal operations of removal should begin.
  If the slick is small and thin (rainbow effect) and not near the shoreline, an absorbent boom instead of a regular boom should be used to sweep the area very slowly and absorb the slick. The product may not have to be moved to the shoreline.

- Removal Methods
  If the Containment slick is thick enough, regular suction equipment may be used first; however, in most instances, a floating skimmer should be used.
  If the floating skimmer starts picking up excess water (slick becomes thin), drawing the boom closer to the bank as product is removed will also keep film of product thicker. However, when the slick becomes too thin, the skimmer should be stopped, and an absorbent applied (with a boat if necessary) to remove the final amounts. The floating skimmer (if speed is a must) or hand skimmers (if water is shallow enough) or both can be used to pick up the product-soaked absorbent. Before pumping the product-soaked absorbent with a floating skimmer, ensure that the absorbent in question can be pumped and will not harm the pump. Several types are nonabrasive to pump internals. If the floating skimmer is used first, the product-soaked absorbent/water mixture should be pumped into a tank truck.
  A better method of retrieving the product-soaked absorbent is to draw it in as close to the shore as possible with the booms used to confine the product initially. The absorbent can then be hand skimmed from the water surface and placed in drums, on plastic sheets or in lined roll-off boxes. It should then be disposed of by acceptable means.

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

Spill on Small to Medium Size Streams (Fast-Flowing Creeks)

- Containment Methods
  The techniques used for product containment on fast-flowing shallow streams are quite different from the ones used on lakes, ponds, or other still bodies of water. The containment and removal processes require a calm stretch of water to allow the product to separate onto the surface of the water. If a calm stretch of water does not exist naturally, a deep slow-moving area should be created by damming. The dam can be constructed by using sandbags, planks or earth. If a dam is required, it should be situated at an accessible point where the stream has high enough banks. The dam should be constructed soundly and reinforced to support the product and water pressure.
  - Underflow dam - The underflow dam is one method that can be used, especially on small creeks. The water is released at the bottom, of the dam using a pipe or pipes which are laid during construction of the dam. The flow rate through the pipe must be enough to keep the dam from overflowing. One method is to lay the pipe at an angle through the dam (while dam is being constructed) so that the height of the downstream end of the pipe will determine the height the water will rise behind the dam.
    Another method used with the underflow dam is having the pipe or pipes sized to carry only a portion of the flow needed. The pipe would be placed at the bottom of the dam and level with the creek bed. The remaining flow of the creek could be siphoned or preferably pumped around the dam from a point away from the dam and from the deepest portion of the pool. The pumping or siphoning can be controlled to maintain the desired water level at the dam. The key is the removal of water through or around the dam at the lowest point in the basin. This prevents the oil from escaping with the released water.
  - Overflow dam - Another method of containment is the overflow type dam. The dam is constructed so that water flows over the dam, but a deep pool is created which slows the surface velocity of the water. Therefore, the condition of a calm stretch of water is met. The overflow dam may be used where larger flow rates (medium size creeks) of water are involved.
    With this type dam, a separate barrier (floating or stationary boom) must be placed across the pool created by the dam. The separate barrier arrests the surface layer of product. At the same time, the water is flowing under the barrier and over the top of the dam. The barrier should be placed at an angle of 45 % across the pool to decrease the effective water velocity beneath it. Also, it helps to concentrate the product at the bank and not all along the barrier. A second barrier should be placed approximately 10 to 15 feet downstream of the first one as a secondary back-up.
    The stationary boom type barrier should be made of wood planks or other suitable material. The stationary boom should be soundly constructed and sealed against the bank. The ends of the planks can be buried in the banks of the stream and timber stakes driven into the stream bed for support as needed. The necessary length of the boom will be approximately 1-1/2 times the width of the waterway.
    The plank boom should extend six to eight inches deep into the water and about two inches or higher above the water level. If the increase in velocity under the stationary boom is causing release of trapped product, it should be moved upward slightly. At no

time should barrier be immersed more than 20% of the depth of the pool at the barrier location; that is, if the pool created by damming is three feet deep, do not exceed an immersion depth of seven inches with the barrier at the position the barrier is installed. A floating boom can be used in place of the stationary type if the created pool's size (bank to bank) and depth will permit. Since changing the depth and/or length of a standard floating boom in a small stream is difficult, the use of the separation of product and water. The advantages of using a floating boom are the speed of deployment and the fact that there is no need for additional support as with the stationary boom.

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

- Removal Methods

Once the containment dams are constructed, the problem or removal of the product from the water surface should be the prime consideration. The removal must be continuous or else build-up of product behind the dams or booms might lead to product escaping the traps.
The type of removal procedures used depends largely on the amount of product being trapped in a given span of time, if the amount of product moving down the stream is of sufficient quantity, the first dam or fixed boom would quite possibly trap enough a floating skimmer to work efficiently. The skimmer will pump the product and possibly some water to a tank truck or other holding tank. Separated water may be released from the bottom of the tank truck if it becomes necessary. The absorbents could then be used at downstream dams or booms. It is inadvisable to place an absorbent in the stream prior to or at the first dam in anticipation of the arriving product. Let the product accumulate at the first dam and use the floating skimmer to recover the product.
Disposal of gross amount of product-soaked absorbent would not then be a problem.
Plastic sheets should be used to place the product- soaked absorbent on as it is hand skimmed from the water. Alternatively, the material may be placed in drums or lined roll-off boxes.
The containment and removal of spilled product on small to medium fast-flowing streams might require a combination of underflow or overflow dams, fixed booms, skimmers, and absorbents, to ensure a complete cleanup.

Spill on Large Streams and Rivers

- Containment Methods
  The containment techniques differ considerably on large streams and rivers versus small streams. First, the smooth calm area of water necessary for product-water separation must be found along the stream or river rather than making one as with small streams. Floating booms (rather than fixed booms or dams) must be used to trap the surfaced product.
  Local conditions of current and wind must be considered when selecting the site for the boom. A point with a low water velocity near the bank, sufficient depth to operate the product removal equipment, and good access are required. The fact that wind may tend to concentrate the product against one bank must be considered. A smooth, undisturbed area of water is required immediately upstream of the boom to ensure that the product has opportunity to separate out onto the surface. The boom should be positioned where the current is at a minimum. It is more effective to boom at a wide, slow position than on a narrow, fast stretch of water.
  If the boom are positioned straight across a river or stream, at right angles to the flow, surface water tends to dive beneath the barrier (boom) when current velocities exceed about ½ knot (0.8 ft./sec.). However, if the current of the entire river is ½ knot or less, then a boom can be positioned straight across the river or large stream angled slightly in relation of the banks. By placing the boom at an angle to the banks, product on the surface is diverted along the boom to the side of the river.
  The current velocity is usually much slower near the riverbank than in the center and the product will move along the boom toward the bank for removal. A water-tight seal between the bank and the boom is essential. A secondary boom should be set up immediately downstream of the first one to capture the amounts that escape the upstream boom. A boom can be employed parallel to the river flow at the bank to form the seal with the booms used to trap the product.
  Where the current velocity of the chosen site exceeds ½ knot, the boom should be positioned in two smooth curves from a point of maximum velocity (usually the center of the river) to both banks. However, this double-boom required product to be removed from both sides of the river.
  To determine the appropriate angle of boom placement and support (mooring) needed to hold the booms in position, the current velocity should be measured by timing a floating object which is 80% submerged over a distance of 100 feet. A time of 60 seconds over this distance indicates a water current of approximately 1 knot.
  For currents from 1 to 2.5 knots (1.7 to 4.2 ft./sec.), the more the boom will have to be angled acute to the bank because of oil entrainment. The length of the boom will have to be such to reach the center of the river. For currents between ½ and 1 knot (0.8 and 1.7 ft./sec.), the angle of employment can be enlarged.
  The major load on the boom is taken by the terminal moorings, particularly the one in the center of the river. However, intermediate moorings are also required both to maintain the smooth curve of the boom to prevent breaking of the boom and to assist with preventing skirt deflection. The intermediate moorings are preferably positioned every 25 feet and must be adjusted to avoid the formation of indentations in the boom profile. This tactic traps product in pockets, prevents its deflection to the bank, and also encourages driving currents. The moorings should be five times the water depth.

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

- Removal Methods
  The product collected upstream of the floating booms in a large stream or river should be removed from the water surface as it accumulates. Regular suction equipment, a floating skimmer, and/or absorbents (including absorbent booms) should be used to remove the product as appropriate to the quantity being trapped in a given span of time. If the amount moving down the stream is of sufficient quantity, the primary floating boom would possibly trap enough for the floating skimmer to work efficiently. The skimmer will pump the product and some water to a tank truck or other holding tank.
  The absorbents would then be used upstream of the secondary boom to absorb the underflow from the primary boom. An absorbent boom can also be placed between the primary and secondary booms to help the other absorbents control the underflow from the primary boom. It is best to hand skim the saturated absorbents and place on plastic sheets. However, if the absorbent used can be pumped after product absorption and speed of removal is a necessity, the floating skimmer can be used to remove the product-soaked absorbent.
  The disadvantage of pumping the product-soaked absorbent to a truck is the volume that will accumulate (skimmer will pump excess water) and the disposal problems associated with the large water/product-soaked absorbent mixture.

Spill on Stream which Flows into Lake or Pond

In certain locations where streams (small and large ones) flow into lakes or ponds at relatively short distances, it is conceivable that a spill could reach the lake before containment and recovery operations are set up. If time permits for containment operations to be set up on the stream in question, it then would be handled as described above depending upon the stream size involved.
However, if product in the stream is near the lake site or if product is flowing into the lake with a significant amount yet to arrive, a different containment should be employed.

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

- Removal Methods
  The removal of product from the lake or ponds surface would be handled as described earlier. For sizable releases, collected product will usually be pumped into tank trucks and transported to a storage facility. Tank trucks are available at several locations throughout.

Sinking or Submerged Oil

- Containment Methods
  Oil that is heavier than water may become submerged in the water column or sink to the bottom, this is called sinking or submerged (sunken) oil. Submerged oil in water with a current of less than 0.7 knots will tend to sink to the bottom. Any current above 0.7 knots have the potential to remove oil from its resting place on the bottom and carry the oil downstream.

  Methods to detect submerged oil include the use of Sonar which has been used to locate submerged oil with some success. Remote and diver operated underwater video detection systems have proved to be useful but is dependent on visibility. Visual observation can be used in shallow water although expert analysis is essential for this technique as aquatic biota (vegetation) in the water may be mistaken for oil. Currently the best method for sampling for submerged oil is to drop weighted sorbent materials such as “pom-pom” snare boom or sorbent chain drags into low areas for short distances and then visually inspected for oil to map sunken oil distribution. This provides a bottom sample indicating whether or not oil is present. Gabion baskets filled with sorbent materials are also used for detection of sunken and mobile oil. These sorbent filters allow water to flow through them thus capturing any suspended or sunken oil. By examining the filter, it can be determined if submerged or sunken oil is present. Collection of core samples can also be a method to detect sunken oil. The sampling area of the core may be too small to be effective but has been historically used for subsurface contamination assessments.

  Oil that does sink to the bottom may act much like oil on dry land, collecting in low lying areas and thus containing itself on the bottom. Sunken and submerged oil such as this can be contained. Types of equipment used to contain oil that is sunken or submerged include net booms, bottom hugging weighted boom, Watergate dams, silt curtains, gabion baskets lined with impermeable membranes, filter fences such as Turner Valley Gates which can also be lined with impermeable membranes, and boom with deep skirts to help resurface submerged oil.

- Removal Methods
  The most effective method to recover oil is the use of drivers with vacuum system to collect concentrations of submerged oil on the bottom. The diver can direct the pumping of oil and can detect when the oil has been recovered. Another common method is to dredge the bottom and remove the oil along with some of the bottom substrate. Dredging is a common method currently used to remediate contaminated sites but may generate a large amount of waste material which must properly managed such as proper characterization and disposal. This method causes the most disturbance to the benthic environment and may not be suitable in all locations.

  Both diver-directed pumping and dredging only work for completely sunken oil. To capture suspended oil an underwater filter can be constructed. This filter is created using some form of porous container such as a Gabion Basket, prawn or crab traps, silt fences and even chicken wire. The container is filled with sorbent material such as oil snares, weighted down, and

submerged into the water column. The sorbent materials are monitored and replaced as needed to continue recovery of oil.

In shallow water, where oil can be seen from the surface, dip nets or pool nets have been successfully used as the most effective way to collect oil. This method is useful if the oil has emulsified or is thick enough to scoop up with nets.

Spill in Urban Areas

Oil spills in urban areas can greatly impact recreational use, human health, wildlife habitat(s), and potential beach or park closures. Manmade structures along waterways require unique protection strategies. Manmade structures could include vertical shore protection structures such as seawalls, piers, and bulkheads, as well as riprap revetments and groins, breakwaters, and jetties. Vertical structures can be constructed of concrete, wood, and corrugated metal. They usually extend below the water surface, although seawalls can have beaches or riprap in front of them. These structures are very common along developed shores, particularly in harbors, marinas, and residential areas. The range in degree of exposure to waves and currents varies widely, from very low in dead-end canals, to very high on offshore breakwaters. Boat wakes can generate wave energy in otherwise sheltered areas.

Maintaining shipping or other kinds of vessel traffic through navigation channels or waterways during a spill response is a difficult consideration because there is usually economic and political pressure to re-establish normal operations as soon as possible. This consideration extends to vehicular traffic through urban areas. Deploying booms and skimmers or constructing recovery sites can conflict with such traffic for several days. Also, passage of deep-draft vessels through the waterway can suddenly change water level and flow or create wakes, causing booms to fail. For these reasons, recovery efforts must be coordinated through the Unified Command to ensure the cooperation of all parties involved.

- Containment Methods
  Containment techniques in an urban area depend greatly on the ability to deploy equipment due to obstacles presented by the urban area. Most booming and containment techniques will work with slight modifications such as direct anchoring instead of the use of booming buoys. Often, debris and other obstacles cause gaps in containment or clog up the flow of oil in diversion booming. Vessel traffic can also cause containment to fail, due to splash over from vessel wakes.

- Removal Methods
  Normal recovery techniques work when recovering oil in an urban area. However, recovery can be hampered by several situations. Floating debris clogging skimming equipment is the main cause for low recovery rates. Another problem for recovery in an urban area is lack of storage space. Often traffic problems or lack of access prevent storage equipment such as frac tanks and vacuum trucks from approaching the recovery zone.

Spill Under Ice

- Containment Methods
  The traditional strategy for dealing with oil under the ice in a river or lake is to cut a slot to aid in recovery. Ice slots can be cut using chain saws, handsaws, ice augers or some form of trencher. Another effective variation of this technique is the diversionary plywood barrier method which is also discussed below.

- Removal Methods
  Ice slotting is a very basic technique used to gain access to oil trapped beneath the ice. In ice slotting, a J shaped outline is sketched into the ice at a 30 degree angle to the current. The slight J hook or curve is necessary at the upstream side to provide flow towards the recovery area. In general, the slot width should be 1.5 times the thickness of the ice. Remember, a block of ice is heavy, and the width of the slot must be taken into consideration so it can be safely removed or pushed under if the water beneath the ice is sufficiently deep. The length of the slot will be determined by the width of the river and strategy.
  This technique is a successful strategy to implement. However, there are a few pitfalls to be aware of. First, responders will fatigue rapidly if required to cut the slot or slots by hand using a chain saw or handheld saw. This can present a problem if there are not an enough trained personnel available. Secondly, when cutting with chain saws, large volumes of water are kicked up by the moving chain onto the responder. This is a safety problem when the responders get wet in extreme cold weather conditions. Wearing rain gear however can reduce this problem.
  A second technique is to slot the ice and use plywood to help divert oil beneath the ice to a recovery area. This technique is called the diversionary plywood barrier method. In this technique, a narrow slot is made through the ice and 4' x 8' sheets of plywood or equivalent are dropped into the slot to create a barrier and force the oil to follow along it to the collection area. This is the same principal employed when using floating boom.
  The slot can be cut or drilled depending on the equipment available at the time of the response. If drilling is required, a gas powered ice auger can be used. In this scenario a series of 8" or 10" holes are drilled next to each other in the J pattern.
  A chain saw can be used to connect the holes if an ice bridge exists between two auger holes. After the ice auguring is complete, plywood can be dropped into the augured slot.
  Again, river ice is dirty and chipper blades on the augers may only last long enough to complete a single auger hole. This technique requires a large inventory of chipper blades. Extra auger flights can be used, which reduces the time to change blades. A real plus to slotting the ice with an ice auger is the limited exposure of responders to water. The water is generally restricted to the area around the responder's feet.
  If an ice auger is not available, a chain saw can be used to cut a narrow slot. After the slot has been cut and ice removed, plywood can be inserted. When using a chainsaw that makes a 3/8" cut, a 1/8"-1/4" plywood or outdoor siding can be inserted into the slot and effectively be used to create the barrier. Again, the downside when using a large chain saws is fatigue and splash from water being kicked up by the chain. However, this problem is not as bad as cutting large slots as described above. Since only a single slot is made, the number of responders can be reduced and extra personal protective equipment in the form of rain gear can be used to minimize the water splash.

Spill on Ice

When managing an oil spill on ice special consideration must be given to several safety factors. Thickness of the ice and general accessibility of equipment must be considered when planning for on-ice recovery. Ice that is too thin to safely traverse or broken ice may prevent active recovery.

- Containment Methods
  For ice-covered on-land or on- water spills, snow or earthen berms may be constructed to contain oil around the leak, if terrain permits. Dikes filled with sorbent materials may be used on spills in smaller streams to create a manmade dam to prevent the further migration of the oil. Oil may become encapsulated due to melting and refreezing of the ice. Oil may then be more difficult to access and remove.

- Removal Methods
  Generally, on-ice recovery consists of the manual removal of the product from the spill site. If conditions permit, vacuum trucks or suction pumps may be used to remove pools of oil that may have collected. Often, product removal will be done by hand using brooms, shovels and rakes. Manually moving the oil/snow mixture into piles for collection where it is either vacuum or manually collected into storage containers.

Spill in Wetland Areas

Wetlands, which include upland and inland marshes, swamps and bogs, are highly sensitive to spills because they collect run-off from surrounding environments, and because they are home to many commercially and ecologically important species. Wetlands are very susceptible to damage and are a high priority to protect. Precautions should be taken so that the recovery effort does not cause more damage than that cause by the release.

- Containment Methods
  Containment booms can be strategically deployed to contain or divert the product into recovery areas where skimmers and vacuums can be used to remove the product. Berms can also be built to contain or divert the product. Consideration must be given to the damage that can be caused by holding the product in the wetland areas. Often, allowing the product to flow to natural collection areas and possibly assisting the flow using high volume low pressure water pumps may be the best course of action.

- Removal Methods
  Skimmers and vacuums can be deployed to recover contained oil. Other acceptable response techniques might include bioremediation, sorbents and in-situ burning. The use of heavy equipment is often not practical because of the damage it can cause to plant and animal life. During recovery, specially designed flat bottom shallow draft vessels and the use of plywood or boards may be used to reduce the damage caused by recovery personnel. If the water table is high and the oil will not permeate the soil, shallow trenches may be dug to collect oil for removal.
  Command must balance the need to remove the product with the damage caused by active removal. Considerations for long term passive recovery should be considered.

Release to Groundwater

- Contaminant Fate and Transport
  In the unlikely event of a release from the pipeline, crude oil will migrate downward under the force of gravity. In shallow unconfined aquifer areas, downward movement of crude oil to the surface of the water table may occur, though immediate emergency response tactics may contain and clean up a release prior to the release reaching groundwater. The rate of penetration depends on the type and amount of released oil (its viscosity), the type of soil (its porosity) and the soil's water saturation. If the release does reach groundwater, dissolved constituents from the crude oil source can dissolve into the groundwater over time (weeks to months), forming a planar plume that may move in the groundwater flow direction, and to a limited degree, some migration may occur initially in other directions because the crude oil may hydrostatically depress the capillary fringe and water table. Removal of the crude oil source eliminates the source of dissolved constituents.
  In a confined aquifer, crude oil would need to move through the surficial low permeable layer, significantly reducing or preventing the release from reaching underlying groundwater. If a small volume of crude oil is released to the subsurface, much of the crude oil will be retained by capillary forces as residual oil in the soil pores, often partially or completely confining the spill to the less consolidated trench material surrounding the pipeline and thereby minimizing the extent of impact in the surrounding/underlying low permeable deposits above the confined aquifer.
  Fate and transport processes of petroleum hydrocarbon constituents of crude oil (PHC) dissolved in the aquifer groundwater usually include: advection; dispersion; diffusion; sorption; volatilization; and, biodegradation reactions. These processes influence the movement of PHCs from the pipeline toward potential receptors. Advective-dispersive processes involve the movement of PHC chemicals along a hydraulic gradient from an area of higher hydraulic head to an area of lower hydraulic head. Diffusion process involves the movement of PHC chemicals along a concentration gradient from an area of higher concentration to an area of lower concentration. Advection and dispersion have a significant influence on the transport of the dissolved-phase PHC constituents in relatively permeable soils, whereas the importance of diffusion increases for moderate and low permeable soils. Sorption processes result in the lower PHC transport velocity than groundwater flow velocity. PHC volatilization and biodegradation results in lower than expected contaminant concentrations.
  PHC plumes have limited mobility in groundwater. Unlike chemicals with high environmental persistence (e.g., trichloroethylene, pesticides), the areal extent of the dissolved PHCs will stabilize over time due to natural attenuation processes. Natural biodegradation through metabolism by naturally occurring microorganisms is often an effective mechanism for reducing the volume of crude oil and its constituents. Natural attenuation will reduce most toxic compounds into non-toxic metabolic by-products, typically carbon dioxide and water. Over a longer period, the area of the contaminant plume may begin to reduce due to natural biodegradation.

Most crude oil constituents are not water soluble. For those constituents that are water soluble (e.g., benzene) the dissolved concentration is not controlled by the amount of oil in contact with the water, but by the concentration of the specific constituent in the oil

6.6 Vulnerability Analysis

The thorough examination of published Area Contingency Plans (ACPs) was conducted to identify sensitive areas in all the response zones.

The Environmental Sensitivity Maps located in Figure 6.2 identify sensitive areas along the Pipeline. The appropriate Area Contingency Plan maps are also included to provide more detailed information on sensitivities and possible potential response options.

6.7 Alternative Response Strategies

There are no pre-approved response options for inland spills within the United States and/or Canada. Any plans to use dispersants or in situ burn by the Company must be approved of by a Unified Command and submitted to the Federal On-Scene Coordinator for Regional Response Team and/or Canadian Regional Environmental Emergency Team (REET) approval prior to such actions being taken.

In Situ Burning

When considering the use of in situ burning the following considerations should be evaluated. In most cases, an agency application with further considerations will need to be completed before burning will be approved by the agency.

- Size, Nature, and Product Spilled
  - Flammability of the product. (Will the product burn?)
  - Location of spill. (Distance and direction to nearest human use areas.)
  - Volume of product released.
  - Estimate of the surface area covered by the spill.
  - How long has oil been exposed?
  - Will burning cause more hazardous by-products?
- Weather and Forecast
  - Current weather conditions. (Rain / Heat)
  - Wind speed and direction.
  - 24-hour forecast.
  - 48-hour forecast.
- Evaluate the Response Operations
  - Is there time enough to conduct burning?
  - Is safety equipment available?
  - Is adequate personnel available for monitoring / emergency response?
  - Is mechanical recovery more intrusive than burning?
- Habitats Impacted and Resources at Risk
  - Have local agency / officials been contacted?

        - Public Health
        - Landowner / Manager
        - Local Fire Management (Fire Marshall)
        - Historic Property Specialist
        - Province / State Resource Agency
        - Stakeholder/Rights-holder interests
    - What is / will be the impact to surface water intakes and wells.
    - Are endangered habitats / endangered species present?
    - Is area used by migratory animals?
    - What wildlife is present?
- Burn Plan
    - How much of the oil is expected to burn?
    - How long will it be expected to burn?
    - How will burn be ignited?
    - How will burn be extinguished?
    - How will burned oil residue be collected?
    - What are the monitoring protocols?

Dispersant Use

Dispersants are not commonly used on inland spills. Working closely with Federal, Province / State and local agencies will be necessary for gaining approval to use dispersants. Since dispersants do not eliminate the oil, only break up and spread the oil throughout the water column, it is important to look at the total effect the oil will have on the environment while considering the use of dispersants. Water sampling may be required to analyze the effects of the dispersant in the water column.

6.8 Control Points

In accordance with previous components of this section, TC Energy recognizes the need to protect uniquely sensitive environments on or near the Keystone Pipeline System Right of Way. To support efforts to protect the environment, TC Energy has taken the initiative to develop Control Points. Control Points are location specific plans which augment the Keystone Pipeline System Emergency Response Plan by providing specific guidance for implementing product containment and/or recovery. These plans should be referenced as a guide only during emergency response. Plan writers acknowledge that numerous factors will affect emergency response operations, and all actions should be modified to meet the demands of a specific incident. These plans do not direct actions, but merely serve as a resource to responders. Information within the Control Points does not supersede any component of the Keystone Pipeline System Emergency Response Plan.

Control Point locations are inspected and evaluated regularly. Any changes noted during Control Points inspections are updated with the Control Point plan. These regular inspections meet the following objectives:

1. Ensure previously identified control points are accessible and reasonable locations to set-up product containment and recovery.

2. Ensure local field staff is familiar with the locations and equipment requirements of control points in their areas, to prepare them to respond efficiently in an emergency.

Figure 6.1 Environmental Sensitivity Maps

These maps are to be utilized as guidelines only. During a real response effort Federal, Province/State, and local agency should be contacted to provide further assistance in the proper identification and protection of the various environmental and socio-economic sensitive areas

Canada Environmental Sensitivity Maps

Canada ESM Map 1

Canada ESM Map 2
Canada ESM Map 3
Canada ESM Map 4
Canada ESM Map 5
Canada ESM Map 6
Canada ESM Map 7
Canada ESM Map 8
Canada ESM Map 9
Canada ESM Map 10
Canada ESM Map 11
Canada ESM Map 12
Canada ESM Map 13
Canada ESM Map 14
Canada ESM Map 15
Canada ESM Map 16
Canada ESM Map 17
Canada ESM Map 18
Canada ESM Map 19
Canada ESM Map 20
Canada ESM Map 21
Canada ESM Map 22
Canada ESM Map 23
Canada ESM Map 24
Canada ESM Map 25
Canada ESM Map 26
Canada ESM Map 27
Canada ESM Map 28

US Environmental Sensitivity Maps

Data Sources: HCA data was provided by PHMSA. Background geography (roads, digital elevation models, rivers and water bodies, etc.) drawn from the USGS and ESRI's national datasets.

US ESM Map 1
US ESM Map 2
US ESM Map 3
US ESM Map 4
US ESM Map 5
US ESM Map 6
US ESM Map 7
US ESM Map 8
US ESM Map 9
US ESM Map 10
US ESM Map 11
US ESM Map 12
US ESM Map 13
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US ESM Map 27
US ESM Map 28
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US ESM Map 30
US ESM Map 31
US ESM Map 32
US ESM Map 33
US ESM Map 34
US ESM Map 35
US ESM Map 36
US ESM Map 37
US ESM Map 38

Greater St. Louis Sub Area Environmental Sensitivity Maps

Data Source: EPA's Inland Sensitivity Atlas October 2000

USL Index Map
USL Map 2
USL Map 3
USL Map 3C1
USL Map 3D1
USL Map 3D2
USL Map 3D3
USL Map 3D4
USL Map 5P51
USL Map 5P53
USL Map 5P54
USL Map 5P62
USL Map 6
USL Map 6P61
USL Map 8
USL Map 9
USL Map 10
USL Map 11
USL Map 12
USL Map 12A2
USL Map 12A3
USL Map 12C2
USL Map 12D2
USL Map 13
USL Map 18
USL Map 19
USL Map 24

Cushing Extension Environmental Sensitivity Maps

Data Source: HCA data provided by PHMSA. Background geography (roads, digital elevation models, rivers and water bodies, etc.) drawn from the USGS and ESRI's national datasets.

Cushing Extension ESM 1
Cushing Extension ESM 2
Cushing Extension ESM 7
Cushing Extension ESM 8

Cushing Extension ESM 3
Cushing Extension ESM 4
Cushing Extension ESM 5
Cushing Extension ESM 6
Cushing Extension ESM 9
Cushing Extension ESM 10
Cushing Extension ESM 11

Gulf Coast Project Environmental Sensitivity Maps

Data Source: HCA data provided by PHMSA. Background geography (roads, digital elevation models, rivers and water bodies, etc.) drawn from the USGS and ESRI's national datasets.

Gulf Coast Project ESM 1
Gulf Coast Project ESM 2
Gulf Coast Project ESM 3
Gulf Coast Project ESM 4
Gulf Coast Project ESM 5
Gulf Coast Project ESM 6
Gulf Coast Project ESM 7
Gulf Coast Project ESM 8
Gulf Coast Project ESM 9
Gulf Coast Project ESM 10
Gulf Coast Project ESM 11
Gulf Coast Project ESM 12
Gulf Coast Project ESM 13
Gulf Coast Project ESM 14
Gulf Coast Project ESM 15
Gulf Coast Project ESM 16
Gulf Coast Project ESM 17

Keystone Houston Lateral (KHL) Environmental Sensitivity Maps

Data Source: Environmental data drawn from the TC Energy supplied PHMSA HCA dataset. Protected Areas database is a nationwide dataset maintained by the USGS.

KHL Index Map
KHL ESM 1
KHL ESM 2
KHL ESM 3
KHL ESM 4
KHL ESM 5 (Citgo Lateral)

Gulf Coast High Consequence Area Maps

Data Source: Environmental data drawn from the TC Energy supplied PHMSA HCA dataset. Protected Areas database is a nationwide dataset maintained by the USGS.

Gulf Coast HCA Index
Gulf Coast HCA Map 1
Gulf Coast HCA Map 2
Gulf Coast HCA Map 3
Gulf Coast HCA Map 4
Gulf Coast HCA Map 5
Gulf Coast HCA Map 6
Gulf Coast HCA Map 7
Gulf Coast HCA Map 8
Gulf Coast HCA Map 9
Gulf Coast HCA Map 10
Gulf Coast HCA Map 11
Gulf Coast HCA Map 12
Gulf Coast HCA Map 13
Gulf Coast HCA Map 14
Gulf Coast HCA Map 15
Gulf Coast HCA Map 16
Gulf Coast HCA Map 17
Gulf Coast HCA Map 18
Gulf Coast HCA Map 19

Sabine Lake Area Maps

Data Source: Texas General Land Office Tool Kit, December 2014.

Complete Maps Sabine Lake Area_Page_001
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Figure 6.2 Endangered/Threatened Species Listing

Data Source: U.S. Fish & Wildlife Service Website

Canada	
Common Name	**Scientific Name**
Animals	
Burrowing Owl	Athene cunicularia
Olive-backed Pocket Mouse	Perognathus fasciatus
Long-billed Curlew	Numenius americanus
Short-eared Owl	Asio flammeus
Northern Leopard Frog	Rana pipiens
Sprague's Pipit	Anthus spragueii
Plants	
Bushy cinquefoil	Potentilla paradoxa
Chaffweed	Anagallis minima
Common tickseed	Coreopsis tinctoria
Dillen's wood sorrel	Oxalis dillenii
Endolepis	Atriplex suckleyi
Few-flowered aster	Aster pauciflorus
Few-flowered salt-meadow grass	Torreyochloa pallida var pauciflora
Lance-leaved loosestrife	Lysimachia hybrida
Little-seed rice grass	Oryzopsis micrantha
Low townsedia	Townsendia exscapa
Nevada rush	Juncus nevadensis
Pale blue-eyed grass	Sisyrinchium septentrionale
Rush-pink	Stephanomeria runcinata
Salt-marsh sand spurry	Spergularia salina
Short-stalk mouse-ear chickweed	Cerastium brachypodum
Shrubby evening-primrose	Calylophus serrulatus
American pellitory	Parietaria pensylvanica
American lopseed	Phryma leptostachya
Fox sedge	Fox sedge
Honewort	Cryptotaenia canadensis
Rice cutgrass	Leersia oryzoides
Yellow water crowfoot	Ranunculus flabellaris

Illinois	
Common Name	**Scientific Name**
Animals	
Loggerhead Shrike	Lanius ludovicianus
Indiana Bat	Myotis sodalis
Black-crowned Night Heron	Nycticorax nycticorax
Eastern Massasauga	Sistrurus catenatus catenatus
Western Sand Darter	Ammocrypta clarum
Kirtland's Snake	Clonophis kirtlandi
Least Bittern	Lxobrychus exilis
Greater Prairie Chicken	Tympanuchus cupido
Barn Owl	Tyto alba
Lake Sturgeon	Acipenser fulvescens
Timber Rattlesnake	Crotalus horridus
Little Blue Heron	Egretta caerulea
Butterfly	Ellipsaria lineolata
Peregrine Falcon	Falco peregrinus
Common Moorhen	Gallinula chloropus
Bigeye Shiner	Notropis boops
Yellow-crowned Night Heron	Nyctanassa violacea
Illinois Chorus Frog	Pseudacris streckeri
Pallid Sturgeon	Scaphirhynchus albus
Royal Catchfly	Silene regia
Lined Snake	Tropidoclonion lineatum
Yellow-headed Blackbird	Xanthocephalus xanthocephalus
Henslow's SparrowAmmodramus henslowii	Ammodramus henslowii
Short-eared Owl	Asio flammeus
Upland Sandpiper	Bartramia longicauda
Northern Harrier	Circus cyaneus
King Rail	Rallus elegans
Barn Owl	Tyto alba
Plants	
Prairie Rose Gentian	Sabatia campestris
Ear-leafed Foxglove	Tomanthera auriculata
Sedge	Carex bromoides
Fibrous-rooted Sedge	Carex communis
Drooping Sedge	Carex prasina
Blazing Star	Liatris scariosa var. nieuwlandii
Prairie Rose Gentian	Sabatia campestris
Grass-leaved Lily	Stenanthium gramineum
Ear-leafed Foxglove	Tomanthera auriculata
Spring Ladies' Tresses	Spiranthes vernalis
Prairie Spiderwort	Tradescantia bracteata

Decurrent False Aster	Boltonia decurrens
Kansas	
Common Name	**Scientific Name**
Animals	
American Burying Beetle	Nicrophorus americanus
Eastern Spotted Skunk	Spilogale putorius
Eskimo Curlew	Numenius borealis
Least Tern	Sterna antillarum
Peregrine Falcon	Falco peregrinus
Piping Plover	Charadrius melodus
Snowy Plover	Charadrius alexandrinus
Western Silvery Minnow	Hybognathus argyritis
Chestnut Lamprey	Ichthyomyzon castaneus
Flathead Chub	Platygobio gracilis
Pallid Sturgeon	Scaphirhynchus albus
Sicklefin Chub	Macrhybopsis meeki
Silver Chub	Macrhybopsis storeriana
Silverband Shiner	Notropis shumardi
Smooth Earth Snake	Virginia valeriae
Sturgeon Chub	Macrhybopsis gelida
Topeka Shiner	Notropis topeka
Whooping Crane	Grus americana
Sharp Hornsnail	Pleurocera acuta
Arkansas Darter	Etheostoma cragini
Arkansas River Shiner	Notropis girardi
Arkansas River Speckled Chub	Macrhybopsis tetranema
Flutedshell Mussel	Lasmigona costata
Missouri	
Common Name	**Scientific Name**
Animals	
Indiana Bat	Myotis sodalis
Pallid Sturgeon	Scaphirhynchus albus
Interior Least Tern	Sterna antillarum athalassos
Eastern Massasauga	Sistrurus catenatus catenatus
Spectaclecase	Cumberlandia monodonta
Plants	
Running Buffalo Clover	Trifolium stoloniferum
Decurrent False Aster	Boltonia decurrens
North Dakota	
Common Name	**Scientific Name**
Animals	
Horned Grebe	Podiceps auritus
American White Pelican	Pelecanus erythrorhynchos

American Bittern	Botaurus lentiginosus
Swainson's Hawk	Buteo swainsoni
Ferruginous Hawk	Buteo regalis
Yellow Rail	Coturnicops noveboracensis
Willet	Catoptrophorus semipalmatus
Upland Sandpiper	Bartramia longicauda
Long-billed Curlew	Numenius americanus
Marbled Godwit	Limosa fedoa
Wilson's Phalarope	Phalaropus tricolor
Franklin's Gull	Larus pipixcan
Black Tern	Chlidonias niger
Black-billed Cuckoo	Coccyzus erythropthalmus
Sprague's Pipit	Anthus spragueii
Grasshopper Sparrow	Ammodramus savannarum
Baird's Sparrow	Ammodramus bairdii
Nelson's Sharp-tailed Sparrow	Ammodramus nelsonii
Lark Bunting	Calamospiza melanocorys
Chestnut-collared Longspur	Calcarius ornatus
Canadian Toad	Bufo hemiophrys
Plains Spadefoot	Spea bombifrons
Smooth Green Snake	Liochlorophis vernalis
Western Hognose Snake	Heterodon nasicus
Black-tailed Prairie Dog	Cynomys ludovicianus
Sturgeon Chub	Macrhybopsis gelida
Sicklefin Chub	Macrhybopsis meeki
Pearl Dace	Margariscus margarita
Blue Sucker	Cycleptus elongatus
Northern Pintail	Anas acuta
Canvasback	Aythya valisineria
Redhead	Aythya americana
Northern Harrier	Circus cyaneus
Golden Eagle	Aquila chrysaetos
Bald Eagle	Haliaeetus leucocephalus
Prairie Falcon	Falco mexicanus
Sharp-tailed Grouse	Tympanuchus phasianellus
Greater Prairie Chicken	Tympanuchus cupido
Greater Sage-grouse	Centrocercus urophasianus
Piping Plover	Charadrius melodus
American Avocet	Recurvirostra americana
Least Tern	Sterna antillarum
Short-eared Owl	Asio flammeus
Burrowing Owl	Athene cunicularia
Red-headed Woodpecker	Melanerpes erythrocephalus

Loggerhead Shrike	Lanius ludovicianus
Sedge Wren	Cistothorus platensis
Dickcissel	Spiza americana
Le Conte's Sparrow	Ammodramus leconteii
Bobolink	Dolichonyx oryzivorus
Common Snapping Turtle	Chelydra serpentina
Short-horned Lizard	Phrynosoma douglassi
Northern Redbelly Snake	Storeria occipitomaculata
Pygmy Shrew	Sorex hoyi
Richardson's Ground Squirrel	Spermophilus richardsonii
Swift Fox	Vulpes velox
River Otter	Lutra canadensis
Black-footed Ferret	Mustela nigripes
Paddlefish	Polyodon spathula
Pallid Sturgeon	Scaphirhynchus albus
Silver Chub	Macrhybopsis storeriana
Northern Redbelly Dace	Phoxinus eos
Flathead Chub	Platygobio gracilis
Trout-perch	Percopsis omiscomaycus
Threeridge	Amblema plicata
Wabash Pigtoe	Fusconaia flava
Mapleleaf	Quadrula quadrula
Black Sandshell	Ligumia recta
Creek Heelsplitter	Lasmigona compressa
Pink Heelsplitter	Potamilus alatus
Whooping Crane	Grus americana
Peregrine Falcon	Falco peregrinus
Brewer's Sparrow	Spizella breweri
McCown's Longspur	Calcarius mccownii
Smooth Softshell Turtle	Apalone mutica
False Map Turtle	Graptemys pseudogeographica
Northern Prairie Skink	Eumeces septentrionalis
Northern Sagebrush Lizard	Sceloporus graciosus
Arctic Shrew	Sorex arcticus
Western Small-footed Myotis	Myotis ciliolabrum
Long-eared Myotis	Myotis evotis
Long-legged Myotis	Myotis volans
Plains Pocket Mouse	Perognathus flavescens
Hispid Pocket Mouse	Chaetodipus hispidus
Sagebrush Vole	Lemmiscus curtatus
Eastern Spotted Skunk	Spilogale putoris
Chestnut Lamprey	Ichthyomyzon castaneus
Silver Lamprey	Ichthyomyzon unicuspis

Central Stoneroller	Campostoma anomalum
Hornyhead Chub	Nocomis biguttatus
Pugnose Shiner	Notropis anogenus
Blacknose Shiner	Notropis heterolepis
Rosyface Shiner	Notropis rubellus
Finescale Dace	Phoxinus neogaeus
Yellow Bullhead	Ameiurus natalis
Flathead Catfish	Pylodictis olivaris
Logperch	Percina caprodes
River Darter	Percina shumardi
Pink Papershell	Potamilus ohiensis
Nebraska	
Common Name	**Scientific Name**
Animals	
Eskimo Curlew	Numenius borealis
Whooping Crane	Grus americana
Interior Least Tern	Sterna antillarum athalassos
Piping Plover	Charadrius melodus
Mountain Plover	Charadrius montanus
Black-footed Ferret	Mustela nigripes
Swift Fox	Vulpes velox
River Otter	Lutra canadensis
Southern Flying Squirrel	Glaucomys volans
Black-tailed Prairie Dog	Cynomys ludovicianus
Pallid Sturgeon	Scaphirhyncus albus
Topeka Shiner	Notropis topeka
Sturgeon chub	Macrhybopsis gelida
Blacknose shiner	Notropis heteropis
Lake sturgeon	Acipenser fulvescens
Northern Redbelly Dace	Phoxinus eos
Finescale Dace	Phoxinus neogaeus
American Burying Beetle	Nicrophorus americanus
Massasauga	Sistrurs catenatus
Scaleshell Mussel	Leptodea leptodon
Plants	
Hayden's (blowout) penstemon	Penstemon haydenii
Colorado Butterfly Plant	Gaura neomexicana coloradensis
Saltwort	Salicornia rubra
Western Prairie Fringed Orchid	Platanthera praeclara
Ute Lady's Tresses	Spiranthes diluvialis
Ginseng	Panax quinquefolium
Small White Lady's Slipper	Cypripedium candidum

South Dakota	
Common Name	**Scientific Name**
Animals	
American Burying Beetle	Nicrophorus americanus
Scaleshell	Leptodea leptodon
Higgins Eye	Lampsilis higginsii
Dakota Skipper	Hesperia dacotae
Banded Killifish	Fundulus diaphanus
Blacknose Shiner	Notropis heterolepis
Finescale Dace	Phoxinus neogaeus
Longnose Sucker	Catostomus catostomus
Northern Redbelly Dace	Phoxinus eos
Pallid Sturgeon	Scaphirhynchus albus
Pearl Dace	Margariscus margarita
Sicklefin Chub	Macrhybopsis meeki
Sturgeon Chub	Macrhybopsis gelida
Topeka Shiner	Notropis topeka
Eastern Hognose Snake	Heterodon platirhinos
False Map Turtle	Graptemys pseudogeographica
Lined Snake	Tropidoclonion lineatum
American Dipper	Cinclus mexicanus
Bald Eagle	Haliaeetus leucocephalus
Eskimo Curlew	Numenius borealis
Interior Least Tern	Sterna antillarum athalassos
Osprey	Pandion haliaetus
Peregrine Falcon	Falco peregrinus
Piping Plover	Charadrius melodus
Whooping Crane	Grus americana
Black-footed Ferret	Mustela nigripes
River Otter	Lontra canadensis
Swift Fox	Vulpes velox
Western Prairie Fringed Orchid	Platanthera praeclara

Oklahoma	
Common Name	**Scientific Name**
Animals	
Mississippi Alligator	Alligator mississippiensis
Gray Bat	Myotis grisescens
Indian Bat	Myotis sodalis
Ozark Bat	Corynorhinus townsendii ingens
Ozark Cavefish	Amblyopsis rosae
Whopping Crane	Grus americana
Eskimo Curlew	Numenius borealis
Leopards Darter	Percina pantherina

Bald Eagle	Haliaeetus leucocephalus
Neosho Madtom	Noturus placidus
Pipping Plover	Charadrius melodus
Ouachita Rock Pocketbook	Arkansia wheeleri
Arkansas River Shiner	Notropis girardi
Least Tern	Sterna antillarum
Black-Capped Vireo	Vireo atricapillus
Red-Cockaded Woodpecker	Picoides borealis
Plants	
Western Prairie Fringed Orchid	Platanthera praeclara

Texas

Common Name	Scientific Name
Animals	
Houston Toad	Anaxyrus houstonensis
Salado Salamander	Eurycea chisholmensis
Cascade Caverns Salamander*	Eurycea latitans
San Marcos Salamander	Eurycea nana
Georgetown Salamander	Eurycea naufragia
Texas Blind Salamander	Eurycea rathbuni
Blanco Blind Salamander*	Eurycea robusta
Barton Springs Salamander	Eurycea sosorum
Jollyville Salamander	Eurycea tonkawae
Comal Blind Salamander*	Eurycea tridentifera
Austin blind salamander	Eurycea waterlooensis
Sheep Frog*	Hypopachus variolosus
White-lipped Frog*	Leptodactylus fragilis
Black-spotted Newt*	Notophthalmus meridionalis
Mexican Burrowing Toad*	Rhinophrynus dorsalis
South Texas Siren (large form)*	Siren sp. 1
Mexican Treefrog*	Smilisca baudinii
Bachman's Sparrow*	Aimophila aestivalis
Botteri's Sparrow*	Aimophila botterii arizonae
Texas Botteri's Sparrow*	Aimophila botterii texana
Sprague's Pipit*	Anthus spragueii
White-tailed Hawk*	Buteo albicaudatus
Zone-tailed Hawk*	Buteo albonotatus
Gray Hawk*	Buteo nitidus
Red Knot	Calidris canutus rufa
Northern Beardless-tyrannulet*	Camptostoma imberbe
Piping Plover	Charadrius melodus
Western Yellow-billed Cuckoo	Coccyzus americanus occidentails
Golden-cheeked Warbler	Dendroica chrysoparia
Reddish Egret*	Egretta rufescens

Swallow-tailed Kite*	Elanoides forficatus
Southwestern Willow Flycatcher	Empidonax traillii extimus
Northern Aplomado Falcon	Falco femoralis septentrionalis
American Peregrine Falcon*	Falco peregrinus anatum
Cactus Ferruginous Pygmy-owl*	Glaucidium brasilianum cactorum
Whooping Crane	Grus americana
Wood Stork*	Mycteria americana
Eskimo Curlew	Numenius borealis
Rose-throated Becard*	Pachyramphus aglaiae
Tropical Parula*	Parula pitiayumi
Red-cockaded Woodpecker	Picoides borealis
White-faced Ibis*	Plegadis chihi
Interior Least Tern	Sterna antillarum athalassos
Sooty Tern*	Sterna fuscata
Mexican Spotted Owl	Strix occidentalis lucida
Attwater's Greater Prairie Chicken	Tympanuchus cupido attwateri
Lesser Prairie-Chicken	Tympanuchus pallidicinctus
Black-capped Vireo	Vireo atricapilla
River Goby*	Awaous banana
Mexican Stoneroller*	Campostoma ornatum
Mexican Goby*	Ctenogobius claytonii
Blue Sucker*	Cycleptus elongatus
Proserpine Shiner*	Cyprinella proserpina
Leon Springs Pupfish	Cyprinodon bovinus
Comanche Springs Pupfish	Cyprinodon elegans
Conchos Pupfish*	Cyprinodon eximius
Pecos Pupfish*	Cyprinodon pecosensis
Devils River Minnow	Dionda diaboli
Creek Chubsucker*	Erimyzon oblongus
Fountain Darter	Etheostoma fonticola
Rio Grande Darter*	Etheostoma grahami
San Felipe Gambusia*	Gambusia clarkhubbsi
Big Bend Gambusia	Gambusia gaigei
San Marcos Gambusia (species extinct)	Gambusia georgei
Clear Creek Gambusia	Gambusia heterochir
Pecos Gambusia*	Gambusia nobilis
Blotched Gambusia (extinct in the wild)*	Gambusia senilis
Rio Grande Chub*	Gila pandora
Rio Grande Silvery Minnow	Hybognathus amarus
Opossum Pipefish*	Microphis brachyurus
Chihuahua Shiner*	Notropis chihuahua
Arkansas River Shiner	Notropis girardi
Bluntnose Shiner (species extinct)*	Notropis simus

Blackside Darter*	Percina maculata
Smalleye Shiner*	Notropis buccula
Sharpnose Shiner	Notropis oxyrhynchus
Paddlefish*	Polyodon spathula
Smalltooth Sawfish	Pristis pectinata
Bluehead Shiner*	Pteronotropis hubbsi
Widemouth Blindcat*	Satan eurystomus
Shovelnose Sturgeon*	Scaphirhynchus platorynchus
Toothless Blindcat*	Trogloglanis pattersoni
Pecos assiminea Snail	Assiminea pecos
Coffin Cave Mold Beetle	Batrisodes texanus
Helotes Mold Beetle	Batrisodes venyivi
Robber Baron Cave Meshweaver	Cicurina baronia
Madla Cave Meshweaver	Cicurina madla
Bracken Bat Cave Meshweaver	Cicurina venii
Government Canyon Bat Cave Meshweaver	Cicurina vespera
Warton Cave Meshweaver*	Cicurina wartoni
Texas Pigtoe*	Fusconaia askewi
Triangle Pigtoe*	Fusconaia lananensis
Diminuitie Amphipod	Gammarus hyalleloides
Pecos Amphipod	Gammarus pecos
Comal Springs Riffle Beetle	Heterelmis comalensis
Texas Fatmucket*	Lampsilis bracteata
Sandbank Pocketbook*	Lampsilis satura
Government Canyon Bat Cave Spider*	Neoleptoneta microps
Tooth Cave Spider*	Neoleptoneta myopica
American Burying Beetle	Nicrophorus americanus
Southern Hickorynut*	Obovaria jacksoniana
Louisiana Pigtoe*	Pleurobema riddellii
Texas Hornshell*	Popenaias popeii
Texas Heelsplitter*	Potamilus amphichaenus
Salina Mucket*	Potamilus metnecktayi
Phantom Cave Snail	Pyrgulopsis texana
Golden Orb*	Quadrula aurea
Smooth Pimpleback	Quadrula houstonensis
False Spike*	Quadrula mitchelli
Texas Pimpleback*	Quadrula petrina
A Ground Beetle	Rhadine exilis
A Ground Beetle	Rhadine infernalis
Tooth Cave Ground Beetle	Rhadine persephone
Diamond Y Spring Snail	Pseudotryonia adamantina
Peck's Cave Amphipod	Stygobromus pecki
Comal Springs Dryopid Beetle	Stygoparnus comalensis

Tooth Cave Pseudoscorpion	Tartarocreagris texana
Kretschmarr Cave Mold Beetle	Texamaurops reddelli
Cokendolpher Cave Harvestman	Texella cokendolpheri
Reddell Harvestman	Texella reddelli
Bone Cave Harvestman	Texella reyesi
Mexican Fawnsfoot*	Truncilla cognata
Texas Fawnsfoot*	Truncilla macrodon
Phantom Spring Snail	Tryonia cheatumi
Gonzales Springsnail	Tryonia circumstriata
Finback Whale	Balaenoptera physalus
Gray Wolf	Canis lupus
Red Wolf	Canis rufus
Rafinesque's Big-eared Bat*	Corynorhinus rafinesquii
Texas Kangaroo Rat*	Dipodomys elator
Spotted Bat*	Euderma maculatum
Pygmy Killer Whale*	Feresa attenuata
Short-finned Pilot Whale*	Globicephala macrorhynchus
Jaguarundi	Herpailurus yaguarondi
Pygmy Sperm Whale*	Kogia breviceps
Dwarf Sperm Whale*	Kogia simus
Southern Yellow Bat*	Lasiurus ega
Ocelot	Leopardus pardalis
Margay*	Leopardus wiedii
Mexican Long-nosed	Leptonycteris nivalis
Humpback Whale	Megaptera novaeangliae
Gervais' Beaked Whale*	Mesoplodon europaeus
White-nosed Coati*	Nasua narica
Killer Whale*	Orcinus orca
Coues' Rice Rat*	Oryzomys couesi
Jaguar	Panthera onca
Palo Duro Mouse*	Peromyscus truei comanche
False Killer Whale	Pseudorca crassidens
Atlantic Spotted Dolphin*	Stenella frontalis
Rough-toothed Dolphin*	Steno bredanensis
West Indian Manatee	Trichechus manatus
Black Bear*	Ursus americanus
Louisiana Black Bear	Ursus americanus luteolus
Goose-beaked Whale*	Ziphius cavirostris
Loggerhead Sea Turtle	Caretta caretta
Scarlet Snake*	Cemophora coccinea
Green Sea Turtle	Chelonia mydas
Reticulated Gecko*	Coleonyx reticulatus
Black-striped Snake*	Coniophanes imperialis

Timber (Canebrake) Rattlesnake*	Crotalus horridus
Reticulate Collared Lizard*	Crotaphytus reticulatus
Leatherback Sea Turtle	Dermochelys coriacea
Texas Indigo Snake*	Drymarchon melanurus erebennus
Speckled Racer*	Drymobius margaritiferus
Atlantic Hawksbill Sea Turtle	Eretmochelys imbricata
Texas Tortoise*	Gopherus berlandieri
Cagle's Map Turtle*	Graptemys caglei
Chihuahuan Mud Turtle*	Kinosternon hirtipes murrayi
Kemp's Ridley Sea Turtle	Lepidochelys kempii
Northern Cat-eyed Snake*	Leptodeira septentrionalis
Smooth Green Snake*	Liochlorophis vernalis
Alligator Snapping Turtle*	Macrochelys temminckii
Brazos Water Snake*	Nerodia harteri
Texas Horned Lizard*	Phrynosoma cornutum
Mountain Short-horned Lizard*	Phrynosoma hernandesi
Louisiana Pine Snake*	Pituophis ruthveni
Chihuahuan Desert Lyre Snake*	Trimorphodon vilkinsonii
Plants	
Large-fruited Sand-verbena	Abronia macrocarpa
South Texas Ambrosia	Ambrosia cheiranthifolia
Star Cactus	Astrophytum asterias
Texas Ayenia	Ayenia limitaris
Texas Poppy-mallow	Callirhoe scabriuscula
Bunched Cory Cactus	Coryphantha ramillosa ssp. ramillosa
Terlingua Creek Cat's-eye	Cryptantha crassipes
Chisos Mountains Hedgehog Cactus*	Echinocereus chisoensis var. chisoensis
Davis' Green Pitaya	Echinocereus davisii
Black Lace Cactus	Echinocereus reichenbachii var. albertii
Nellie's Cory Cactus	Escobaria minima
Sneed's Pincushion Cactus	Escobaria sneedii var. sneedii
Guadalupe Fescue*	Festuca ligulata
Johnston's Frankenia	Frankenia johnstonii
Earth Fruit	Geocarpon minimum
Pecos Sunflower	Helianthus paradoxus
Neches River Rose-mallow	Hibiscus dasycalyx
Slender Rushpea*	Hoffmannseggia tenella
Texas Prairie Dawn*	Hymenoxys texana
Texas Golden Gladecress*	Leavenworthia texana
Walker's Manioc*	Manihot walkerae
Texas Trailing Phlox*	Phlox nivalis ssp. texensis
White Bladderpod*	Physaria pallida
Zapata Bladderpod*	Physaria thamnophila

Little Aguja Pondweed*	Potamogeton clystocarpus
Hinckley's Oak	Quercus hinckleyi
Chaffseed*	Schwalbea americana
Tobusch Fishhook Cactus*	Sclerocactus brevihamatus ssp. tobuschii
Lloyd's Mariposa Cactus	Sclerocactus mariposensis
Navasota Ladies'-tresses*	Spiranthes parksii
Bracted Twistflower*	Streptanthus bracteatus
Texas Snowbells*	Styrax platanifolius spp. texanus
Ashy Dogweed*	Thymophylla tephroleuca
Texas Wild-rice*	Zizania texana

*State-Listed Only

Figure 6.3 Aquifers

Saskatchewan	
Name	**Province**
Johsbourgh Valley & Empress	SK
Buried Sand Gravel	
Swift Current Valley	SK
Gravebourgh Valley	SK
Neidpath Valley	SK
Condie Moraine	SK
Great Sand Hills	SK
Upper Foral Formation Sands and Gravels	SK
Empress Buried Valley Group	SK
Aquifers and Interglacial Aquifers	SK
Judith River Formation	SK

Manitoba	
Name	**Province**
Winkler	MB

North Dakota	
Name	**County, State**
Pembina River	Cavalier & Pembina, ND
Icelandic	Cavalier & Pembina, ND
Pembina Delta	Cavalier & Pembina, ND
Edinburg	Pembina & Walsh, ND
Eliot	Ransom, ND
Englevale	Sargent, ND
Spiritwood A.D. System	Sargent, ND
Brampton	Sargent, ND

South Dakota	
Name	**County, State**
Middle James	Marshall, SD

Nebraska	
Name	**County, State**
High Plains	Nebraska

Kansas	
Name	**County, State**
Lower Cretacous	Marshall, Kansas
Glacial Drift Aquifer	Washington, KS

Dakota Aquifer	Washington, Clay, Dickenson, & Marion, KS
Alluvial Aquifer	Washington, Clay, Riley, Dickenson, Marion, Butler, Cowley, & Sumner, KS

Missouri	
Name	**County, State**
Ozark Plateaus	Missouri

Illinois	
Name	**County, State**
Mississippian	Madison, Illinois

Oklahoma	
Name	**County, State**
Major Aquifers	
Vamoods Ada	Payne, Creek, Lincoln, Okfuskee, Hughes, Seminole, OK
Garber Wellington	Payne, Lincoln, OK
Antlers	Bryan, Johnston, Atok, OK
Arbuckle Simpson	Johnston, Pontotoc, Coal, OK
Gerty Sand	Pontotoc, OK
Canadian River	Seminole, Pontotoc, Hughes, OK
North Canadian River	Okfuskee, Seminole, OK
Salt Fork of the Arkansas River	Kay, Noble, OK
Arkansas River	Kay, Noble, Osage, and Pawnee, OK
Vamoosa-Ada	Payne, Lincoln, OK
Minor Aquifers	
East Central Oklahoma	Okfuskee, Hughes, OK
Pennsylvanian	Coal, OK
Kiamichi	Atoka, OK
Woodbine, Red River	Bryan, OK

Texas	
Name	**County, State**
Major Aquifers	
Trinity (sub crop)	Fannin, Lamar, Delta, TX
Carrizo Wilcox	Hopkins, Franklin, TX
Carrizo Wilcox, Carrizo Wilcox (sub crop)	Wood, TX
Carrizo Wilcox (sub crop)	Upshur, TX
Carrizo Wilcox, Carrizo Wilcox (sub crop)	Rusk, Smith, Cherokee, Nacogdoches, TX
Carrizo Wilcox (sub crop)	Angelina, TX
Chicot (Gulf Coast Aqiufer Sys)	Polk, Hardin, Harris, Liberty, Orange, Jefferson, TX
Minor Aquifers	

Woodbine, Woodbine (sub crop)	Fannin, TX
Woodbine, Woodbine (sub crop), Blossom, Blossom (sub crop)	Lamar, TX
Nacatoch	Delta, Franklin, TX
Nacatoch, Nacatoch (sub crop)	Hopkins, TX
Queen City	Wood, Upshur, Smith, Rusk, TX
Queen City, Sparta	Cherokee, TX
Queen City, Queen City (sub crop), Sparta, Sparta (sub crop), Yegua-Jackson	Nacogdoches, TX
Queen City (sub crop), Sparta (sub crop), Yegua-Jackson	Angelina, TX
Yegua-Jackson	Polk, TX

Hydraulically Sensitive Areas and Operator defined HCAs	
Name	**Location**
Kickapoo Indian Reservation	Brown County, KS
Seward Wellhead Protection Area	Seward, NE
Winkler Aquifer (Operator defined HSR)	Winkler, Manitoba
Middle James Aquifer (Operator defined HCA)	Marshall County, SD

Figure 6.4 Affected HCA/Environmental

US Environmentally Sensitive Areas			
ID	Source	Organization	Map Sheet
365	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
368	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
412	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
640	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
826	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
828	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
842	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
458	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
125	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
131	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
132	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
140	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
141	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
142	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
143	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
144	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
145	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
146	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
153	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
187	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
210	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
211	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
232	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
233	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
234	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
254	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
257	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
272	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
273	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
274	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
275	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
276	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
277	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
292	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
326	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
344	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
345	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
722	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
723	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
724	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16

725	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
726	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
751	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
775	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
776	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
777	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
778	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
779	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
805	NENHPTT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
433	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 16
445	SDNHPPT	South Dakota Natural Heritage Database	U.S. Map Sheet 13
800	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
865	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
792	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
825	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
283	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
284	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
614	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
615	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
1027	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 24
1028	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 24
223	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
224	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
285	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
286	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
287	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
312	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
361	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
539	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
540	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
551	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
616	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
617	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
618	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
644	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 16
768	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 18
780	NENHPPT	Nebraska Natural Heritage Program	U.S. Map Sheet 19
587	NDNHPPT	North Dakota Natural Heritage Program	U.S. Map Sheet 7
109	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
110	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
115	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
119	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
120	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36

129	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
130	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1227	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 36
1273	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
1282	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
1283	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
239	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1057	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1058	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1059	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1066	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1067	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
186	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 31
187	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 32
194	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 28
195	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 28
203	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 32
204	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 32
214	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 32
227	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
245	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
246	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
249	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
253	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
254	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
258	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1230	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
1232	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
1261	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
1286	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
20	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
556	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 32
560	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 28
1060	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1062	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1063	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1065	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
1069	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
48	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
145	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
181	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
417	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
142	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 24

203	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 24
226	KSNHPPT	Kansas Natural Heritage Inventory	U.S. Map Sheet 27
424	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
425	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
427	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
428	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 27
45	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 36
521	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
522	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
527	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
537	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
554	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
555	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
556	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
562	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
563	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
103	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
132	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
416	ILNHPPT	Illinois Natural Heritage Database Program	U.S. Map Sheet 35
536	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
539	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
540	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
541	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
180	ILNHPPT	Illinois Natural Database Program	U.S. Map Sheet 38
378	ILNHPPT	Illinois Natural Database Program	U.S. Map Sheet 38
381	ILNHPPT	Illinois Natural Database Program	U.S. Map Sheet 38
436	ILNHPPT	Illinois Natural Database Program	U.S. Map Sheet 38
508	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
557	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
559	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
560	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
561	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
564	MONHPPT	Missouri Natural Heritage Program	U.S. Map Sheet 36
438	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 13
954	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 13
1466	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 11
1608	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 13
2298	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 13
557	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
840	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 14
976	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2384	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2559	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17

2925	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 14
71	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
145	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
152	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
199	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 13
200	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 13
857	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
858	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
1246	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
1292	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 10
1401	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 9
1477	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 12
1647	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 9
1731	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 12
1757	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2046	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2057	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 10
2109	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 14
2169	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2237	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 15
2394	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 12
2407	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2579	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 9
2583	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 14
2663	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
2846	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 14
2958	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 17
3017	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 9
3018	TXNHPPT	The Natural Conservancy of Texas	XL Line Map Sheet 9
1867	TXNHPPT	The Nature Conservancy of Texas	KHL ESM Map 4
2215	TXNHPPT	The Nature Conservancy of Texas	KHL ESM Map 3
3180	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
3183	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
3209	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
3211	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
3217	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
3218	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
532	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
137	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1
141	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
144	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1
155	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1
173	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1

194	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1
321	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
322	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
410	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 5
202	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 5
210	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
361	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
387	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
390	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
396	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 4
478	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
570	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
713	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
715	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
725	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
728	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 4
729	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
737	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
738	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 6
770	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
796	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1
797	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 1
816	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
826	OKNHPPT	Oklahoma Natural Heritage Inventory	XL Line Map Sheet 3
316	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
323	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
325	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 10
333	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
349	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
357	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
660	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 10
688	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 9
695	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 9
716	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 10
738	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 9
806	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
808	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 9
810	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
811	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
813	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
821	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 11
824	OKNHPPT	Oklahoma Natural Heritage Inventory	Cushing Map Sheet 9
64	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4

76	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
87	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
90	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
112	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 3
113	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
125	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 8
134	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 3
144	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
166	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
168	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
170	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
181	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 3
184	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
189	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 8
197	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
200	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 3
201	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 8
202	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 7
203	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 2
206	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
211	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
212	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
216	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
217	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 6
219	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 7
239	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 4
244	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
246	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 3
248	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 7
252	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
260	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
261	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 5
325	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 7
349	KSNHPPT	Kansas Natural Heritage Inventory	Cushing Map Sheet 8

US High Populated Areas				
HPA ID	Name	County	State	Map Sheet
737	St. Joseph, MO-KS	Buchanan	Missouri	U.S. Map Sheet 27
887	Alton, IL	Madison	Illinois	U.S. Map Sheet 36
888	St. Louis, MO-IL	Madison	Illinois	U.S. Map Sheet 36
1066	Houston	Chambers	Texas	KHL ESM Map 4
1086	Houston	Harris	Texas	KHL EMS Map 4

US Populated Areas				
ID	Name	County	State	Map Sheet
4048	Yankton	Yankton	South Dakota	U.S. Map Sheet 16
4150	Roswell	Miner	South Dakota	U.S. Map Sheet 13
4204	Iroquois	Kingsbury	South Dakota	U.S. Map Sheet 12
4220	Menno	Hutchinson	South Dakota	U.S. Map Sheet 15
4323	Raymond	Clark	South Dakota	U.S. Map Sheet 11
9956	Hoskins	Wayne	Nebraska	U.S. Map Sheet 18
9957	Sholes	Wayne	Nebraska	U.S. Map Sheet 17
10011	Seward	Seward	Nebraska	U.S. Map Sheet 21
10369	Leigh	Colfax	Nebraska	U.S. Map Sheet 19
10405	Randolph	Cedar	Nebraska	U.S. Map Sheet 17
10429	Garrison	Butler	Nebraska	U.S. Map Sheet 20
10526	Lankin	Walsh	North Dakota	U.S. Map Sheet 3
10639	Walhalla	Pembina	North Dakota	U.S. Map Sheet 1
12318	Renick	Randolph	Missouri	U.S. Map Sheet 32
12480	Middletown	Montgomery	Missouri	U.S. Map Sheet 34
12556	Cave	Lincoln	Missouri	U.S. Map Sheet 34
12560	Moscow Mills	Lincoln	Missouri	U.S. Map Sheet 35
12561	Old Monroe	Lincoln	Missouri	U.S. Map Sheet 35
12563	Troy	Lincoln	Missouri	U.S. Map Sheet 34
12832	Gower	Clinton	Missouri	U.S. Map Sheet 28
12836	Plattsburg	Clinton	Missouri	U.S. Map Sheet 28
12877	Brunswick	Chariton	Missouri	U.S. Map Sheet 30
12880	Keytesville	Chariton	Missouri	U.S. Map Sheet 31
12952	Cowgill	Caldwell	Missouri	U.S. Map Sheet 29
12955	Kingston	Caldwell	Missouri	U.S. Map Sheet 29
12961	Agency	Buchanan	Missouri	U.S. Map Sheet 27
12965	Gower	Buchanan	Missouri	U.S. Map Sheet 28
16649	Severance	Doniphan	Kansas	U.S. Map Sheet 26
16754	Robinson	Brown	Kansas	U.S. Map Sheet 26
17901	Vernon	Marion	Illinois	U.S. Map Sheet 38
18793	Keyesport	Bond	Illinois	U.S. Map Sheet 38
18797	Pierron	Bond	Illinois	U.S. Map Sheet 37
18798	Pocahontas	Bond	Illinois	U.S. Map Sheet 37

	Cushing	Payne	Oklahoma	U.S. Map Sheet 1
	Perkins	Payne	Oklahoma	U.S. Map Sheet 1
	Quay	Payne	Oklahoma	U.S. Map Sheet 1
	Ripley	Payne	Oklahoma	U.S. Map Sheet 1
	Stillwater	Payne	Oklahoma	U.S. Map Sheet 1
	Yale	Payne	Oklahoma	U.S. Map Sheet 1
	Depew	Creek	Oklahoma	U.S. Map Sheet 1
	Drumright	Creek	Oklahoma	U.S. Map Sheet 1
	Oilton	Creek	Oklahoma	U.S. Map Sheet 1
	Shamrock	Creek	Oklahoma	U.S. Map Sheet 1
	Agra	Lincoln	Nebraska	U.S. Map Sheet 1
	Chandler		Nebraska	U.S. Map Sheet 1
	Davenport		Nebraska	U.S. Map Sheet 1
	Kendrick		Nebraska	U.S. Map Sheet 1
	Prauge		Nebraska	U.S. Map Sheet 1
	Sparks		Nebraska	U.S. Map Sheet 1
	Stroud		Nebraska	U.S. Map Sheet 1
	Tryon		Nebraska	U.S. Map Sheet 1
	Bearden	Okfuskee	Oklahoma	U.S. Map Sheet 2
	Boley		Oklahoma	U.S. Map Sheet 2
	Castle		Oklahoma	U.S. Map Sheet 2
	Okemah		Oklahoma	U.S. Map Sheet 2
	Paden		Oklahoma	U.S. Map Sheet 2
	Atwood	Hughes	Oklahoma	U.S. Map Sheet 3
	Calvin		Oklahoma	U.S. Map Sheet 3
	Gerty		Oklahoma	U.S. Map Sheet 4
	Holdenville		Oklahoma	U.S. Map Sheet 3
	Horntown		Oklahoma	U.S. Map Sheet 3
	Spaulding		Oklahoma	U.S. Map Sheet 3
	Wetumka		Oklahoma	U.S. Map Sheet 3
	Yeager		Oklahoma	U.S. Map Sheet 3
	Bowlegs	Seminole	Oklahoma	U.S. Map Sheet 3
	Cromwell		Oklahoma	U.S. Map Sheet 3
	Lima		Oklahoma	U.S. Map Sheet 3
	Sasakwa		Oklahoma	U.S. Map Sheet 3
	Seminole		Oklahoma	U.S. Map Sheet 3
	Wewoka		Oklahoma	U.S. Map Sheet 3
	Allen	Pontotoc	Oklahoma	U.S. Map Sheet 4
	Fancis		Oklahoma	U.S. Map Sheet 4
	Stonewall		Oklahoma	U.S. Map Sheet 4
	Centrahoma	Coal	Oklahoma	U.S. Map Sheet 4
	Coalgate		Oklahoma	U.S. Map Sheet 4
	Lehigh		Oklahoma	U.S. Map Sheet 5

	Phillips		Oklahoma	U.S. Map Sheet 4
	Tupelo		Oklahoma	U.S. Map Sheet 4
	Bromide	Johnston	Oklahoma	U.S. Map Sheet 5
	Kenefic		Oklahoma	U.S. Map Sheet 5
	Wapanucka		Oklahoma	U.S. Map Sheet 5
	Atoka	Atoka	Oklahoma	U.S. Map Sheet 5
	Caney		Oklahoma	U.S. Map Sheet 5
	Stringtown		Oklahoma	U.S. Map Sheet 5
	Tushka		Oklahoma	U.S. Map Sheet 5
	Bennington	Bryan	Oklahoma	U.S. Map Sheet 6
	Bokchito		Oklahoma	U.S. Map Sheet 6
	Caddo		Oklahoma	U.S. Map Sheet 5
	Paris	Lamar	Texas	U.S. Map Sheet 7
	Reno		Texas	U.S. Map Sheet 7
	Roxton		Texas	U.S. Map Sheet 7
	Toco		Texas	U.S. Map Sheet 7
	Honey Grove	Fannin	Texas	U.S. Map Sheet 7
	Cooper	Delta	Texas	U.S. Map Sheet 7
	Pecan Gap		Texas	U.S. Map Sheet 7
	Mount Vernon	Franklin	Texas	U.S. Map Sheet 8
	Winnsboro		Texas	U.S. Map Sheet 9
	Como	Hopkins	Texas	U.S. Map Sheet 8
	Sulphur Springs		Texas	U.S. Map Sheet 8
	Tira		Texas	U.S. Map Sheet 8
	Hawkins	Wood	Texas	U.S. Map Sheet 10
	Quitman		Texas	U.S. Map Sheet 9
	Big Sandy	Upshur	Texas	U.S. Map Sheet 10
	Gilmer		Texas	U.S. Map Sheet 10
	Arp	Smith	Texas	U.S. Map Sheet 10
	New Chapel Hill		Texas	U.S. Map Sheet 10
	Troup		Texas	U.S. Map Sheet 11
	Tyler		Texas	U.S. Map Sheet 10
	Whitehouse		Texas	U.S. Map Sheet 10
	Winona		Texas	U.S. Map Sheet 10
	Henderson	Rusk	Texas	U.S. Map Sheet 11
	New London		Texas	U.S. Map Sheet 11
	Overton		Texas	U.S. Map Sheet 11
	Alto	Cherokee	Texas	U.S. Map Sheet 12
	Gallatin		Texas	U.S. Map Sheet 11
	New Summerfield		Texas	U.S. Map Sheet 11
	Reklaw		Texas	U.S. Map Sheet 11
	Rusk		Texas	U.S. Map Sheet 11
	Wells		Texas	U.S. Map Sheet 12

	Cushing	Nacogdoches	Texas	U.S. Map Sheet 12
	Nacogdoches		Texas	U.S. Map Sheet 12
	Burke	Angelina	Texas	U.S. Map Sheet 13
	Diboll		Texas	U.S. Map Sheet 13
	Hudson		Texas	U.S. Map Sheet 13
	Lufkin		Texas	U.S. Map Sheet 13
	Corrigan	Polk	Texas	U.S. Map Sheet 14
	Goodrich		Texas	U.S. Map Sheet 14
	Livingston		Texas	U.S. Map Sheet 14
	Seven Oaks		Texas	U.S. Map Sheet 14
	West Livingston		Texas	U.S. Map Sheet 14
	Ames	Liberty	Texas	U.S. Map Sheet 16
	Daisetta		Texas	U.S. Map Sheet 16
	Dayton Lakes		Texas	U.S. Map Sheet 16
	Devers		Texas	U.S. Map Sheet 16
	Hardin		Texas	U.S. Map Sheet 16
	Kenefick		Texas	U.S. Map Sheet 16
	Liberty		Texas	U.S. Map Sheet 16
	Lumberton	Hardin	Texas	U.S. Map Sheet 16
	Pinewood Estates		Texas	U.S. Map Sheet 16
	Sour Lake		Texas	U.S. Map Sheet 16
	Bridge City	Orange	Texas	U.S. Map Sheet 17
	Mauriceville		Texas	U.S. Map Sheet 17
	Orange		Texas	U.S. Map Sheet 17
	Rose City		Texas	U.S. Map Sheet 17
	Vidor		Texas	U.S. Map Sheet 17
	West Orange		Texas	U.S. Map Sheet 17
	Beaumont	Jefferson	Texas	U.S. Map Sheet 17
	Bevil Oaks		Texas	U.S. Map Sheet 17
	Central Garden		Texas	U.S. Map Sheet 17
	China		Texas	U.S. Map Sheet 16
	Groves		Texas	U.S. Map Sheet 17
	Nome		Texas	U.S. Map Sheet 16
	Pine Forest		Texas	U.S. Map Sheet 17
	Port Arthur		Texas	U.S. Map Sheet 17
	Port Neches		Texas	U.S. Map Sheet 17
	Nederland		Texas	U.S. Map Sheet 17
2740	Ames	Liberty	Texas	KHL ESM Map 2
2742	Daisetta		Texas	KHL ESM Map 2
2743	Dayton		Texas	KHL EMS Map 2
2746	Hardin		Texas	KHL EMS Map 1
2748	Liberty		Texas	KHL EMS Map 2
2749	Mont Belvieu		Texas	KHL EMS Map 3

2989	Barrett	Harris	Texas	KHL EMS Map 4
2995	Crosby		Texas	KHL EMS Map 4
3019	Sheldon		Texas	KHL EMS Map 4
3421	Mont Belvieu	Chambers	Texas	KHL EMS Map 3
3422	Old River-Winfree		Texas	KHL EMS Map 3

US Dams				
Dam Name	**County**	**River**	**State**	**Map Sheet**
Unnamed	Doniphan	TR-Missouri River	KS	U.S. Map Sheet 27
Ksnoname 4213	Doniphan	TR-Brush Creek	KS	U.S. Map Sheet 27
Upper Turtle R. Fld. Ret #2	Grand Forks	Skunk Coulee	ND	U.S. Map Sheet 3
Tydol	Creek	TR-Tiger CR	OK	Cushing Map Sheet 11
SCS-Stillwater Creek Site-01	Payne	Deer Creek	OK	Cushing Map Sheet 11
SCS-Stillwater Creek Site-40	Noble	North Stillwater Creek	OK	Cushing Map Sheet 10
SCS-Stillwater Creek Site-41	Noble	TR-North Stillwater Creek	OK	Cushing Map Sheet 10
SCS-Lower Black Bear Creek Site-19M	Pawnee	Black Beer Creek	OK	Cushing Map Sheet 10
SCS-Lower Black Bear Creek Site-23	Pawnee	TR-Camp Creek	OK	Cushing Map Sheet 10
SCS-Lower Black Bear Creek Site-16	Pawnee	TR-Pepper Creek	OK	Cushing Map Sheet 10
SCS-Lower Black Bear Creek Site-04	Pawnee	Skedee CR	OK	Cushing Map Sheet 10
Sooner	Pawnee	Greasy CR	OK	Cushing Map Sheet 10
Kaw Lake	Kay	Arkansas River	OK	Cushing Map Sheet 9
Ponca	Kay	Turkey Creek	OK	Cushing Map Sheet 9
Winfield City Of, Timber Creek MPD No 29	Cowley	Timber Creek	KS	Cushing Map Sheet 7
Muddy Creek WJD No 27, FRD No 4-6	Butler	Muddy Creek	KS	Cushing Map Sheet 7
Augusta City Of, Santa Fe Lake Dam	Butler	Dry Creek	KS	Cushing Map Sheet 7
El Dorado Lake	Butler	Walnut River	KS	Cushing Map Sheet 6
Marion County	Marion	TR-Cottonwood River	KS	Cushing Map Sheet 5
Marion Lake	Marion	Cottonwood River	KS	Cushing Map Sheet 5
Herington City Of, Multiple Purpose Dam #6	Dickinson	Lyon Creek	KS	Cushing Map Sheet 4
Lyons Creek MPD #6	Dickinson	Lyon Creek	KS	Cushing Map Sheet 4
Kansas Fish and Game Commission (Kansas Dept. Of Wildlife & Parks)	Geary	TR-Lyon Creek	KS	Cushing Map Sheet 4
Milford Dam	Geary	Republican River	KS	Cushing Map Sheet 3
Franklin County Dam	Franklin	Big Cypress Creek	TX	U.S. Map Sheet 9
Lake Loma Dam	Upshur	Big Sandy Creek	TX	U.S. Map Sheet 10
Lake Striker Dam	Rusk	Striker Creek	TX	U.S. Map Sheet 11

Bayou Loco Dam	Nacogdoches	Loco Bayou	TX	U.S. Map Sheet 12
Sheldon Reservoir Dam	Harris	Carpenters Bayou	TX	KHL ESM Map 4
Lake Houston Dam	Harris	San Jacinto River	TX	KHL ESM Map 4
Alders Reservoir Dam	Liberty	Big Caney Creek	TX	KHL ESM Map 3

US Lakes

Name	State	Map Sheet
Lake Ashtabula	ND	U.S. Map Sheet 5
Lone Tree Lake	ND	U.S. Map Sheet 7
Carlyle Lake	IL	U.S. Map Sheet 38
Stroud Lake	OK	Cushing Map Sheet 1
Antwine Lake	OK	Cushing Map Sheet 9
Horseshoe Lake	OK	Cushing Map Sheet 9
Indian Hills Lake	OK	Cushing Map Sheet 9
Cushing Lake	OK	Cushing Map Sheet 11
Hazen lake	OK	Cushing Map Sheet 10
Lake McMurtry	OK	Cushing Map Sheet 10
Sanborn Lake	OK	Cushing Map Sheet 10
Yost Reservoir	OK	Cushing Map Sheet 10
Boomer Lake	OK	Cushing Map Sheet 10
Feaster Lake	OK	Cushing Map Sheet 10
Pawnee Lake	OK	Cushing Map Sheet 10
Tydol Lake	OK	Cushing Map Sheet 11
Stroud Lake	OK	Cushing Map Sheet 11
Callan Lake	OK	Cushing Map Sheet 1
Washington County State Lake	OK	Cushing Map Sheet 1
Ash Lake	OK	Cushing Map Sheet 1
Lake Herington	OK	Cushing Map Sheet 4
Marion Reservoir	OK	Cushing Map Sheet 5
Marion County Lake	OK	Cushing Map Sheet 5
Stillwater Lake	OK	Cushing Map Sheet 2
Clay County Lake	OK	Cushing Map Sheet 3
Terrapin Lake	OK	Cushing Map Sheet 4
Geary County State Lake	OK	Cushing Map Sheet 4
Wentz Lake	OK	Cushing Map Sheet 9
Timber Creek Lake	OK	Cushing Map Sheet 7
Newkirk County Club lake	OK	Cushing Map Sheet 9
Newkirk Lake	OK	Cushing Map Sheet 8
Lake Wynds	OK	Cushing Map Sheet 8
Harvey County East Park Lake	OK	Cushing Map Sheet 6
Santa Fe Lake	OK	Cushing Map Sheet 7
Beech Lake	OK	Cushing Map Sheet 7
Augusta Lake	OK	Cushing Map Sheet 7

El Dorado Lake	OK	Cushing Map Sheet 6
Big Cypress Creek	TX	U.S. Map Sheet 9
Big Sandy Lake	TX	U.S. Map Sheet 10
Lake Striker	TX	U.S. Map Sheet 11
Fiberboard Lake	TX	U.S. Map Sheet 13
Yellow Bluff Lake	TX	U.S. Map Sheet 13
Ryan Lake	TX	U.S. Map Sheet 13
Black Cat Lake	TX	U.S. Map Sheet 13
Sabine Lake	TX	U.S. Map Sheet 17
Day Lake	TX	KHL ESM Map 2
Josie Lake	TX	KHL ESM Map 2
Cypress Lake	TX	KHL ESM Map 2
Lake Forest	TX	KHL ESM Map 1
Gordon Lake	TX	KHL ESM Map 2
Demijohn Lake	TX	KHL ESM Map 3
Four-H Lake	TX	KHL ESM Map 2
Basin Lake	TX	KHL ESM Map 2
Duncan Lake	TX	KHL ESM Map 2
Rusk Number 1 Lake	TX	KHL ESM Map 2
Dayton Canal Company Lake	TX	KHL ESM Map 2
Stumpy Lake	TX	KHL ESM Map 1
Wooten Lake	TX	KHL ESM Map 2
Lake Liberty	TX	KHL ESM Map 2
Timber Lake	TX	KHL ESM Map 2
Snag Lake	TX	KHL ESM Map 2
Lake Houston	TX	KHL ESM Map 4
Black Lake	TX	KHL ESM Map 4
Faucet Lake	TX	KHL ESM Map 4
Buckhorn Lake	TX	KHL ESM Map 4
George White Lake	TX	KHL ESM Map 4
Sandy Lake	TX	KHL ESM Map 4
McCracken Lake	TX	KHL ESM Map 4
Muleshoe Lake	TX	KHL ESM Map 4
Tank Lake	TX	KHL ESM Map 4
Cedar Bayou Lake	TX	KHL ESM Map 4
West Camp Lake	TX	KHL ESM Map 4
Simms Lake	TX	KHL ESM Map 4
Bakers Lake	TX	KHL ESM Map 4
Clear Lake	TX	KHL ESM Map 4
Rickett Lake	TX	KHL ESM Map 4

US Rivers and Streams			
Feature (Stream/River)	Name	State	Map Sheet
Artificial Path	Ash Creek	OK	Cushing Map Sheet 1
Stream / River	Ash Creek	OK	Cushing Map Sheet 1
Connector	Big Indian Creek	OK	Cushing Map Sheet 1
Stream / River	Big Indian Creek	OK	Cushing Map Sheet 1
Stream / River	Bills Creek	OK	Cushing Map Sheet 1
Artificial Path	Bottle Creek	OK	Cushing Map Sheet 1
Stream / River	Bottle Creek	OK	Cushing Map Sheet 1
Stream / River	Brawner Creek	OK	Cushing Map Sheet 1
Artificial Path	Brawner Creek	OK	Cushing Map Sheet 1
Stream / River	Buffalo Creek	OK	Cushing Map Sheet 1
Stream / River	Cedar Creek	OK	Cushing Map Sheet 1
Stream / River	Coon Creek	OK	Cushing Map Sheet 1
Stream / River	Cottonwood Creek	OK	Cushing Map Sheet 1
Stream / River	Cub Creek	OK	Cushing Map Sheet 1
Artificial Path	Cub Creek	OK	Cushing Map Sheet 1
Artificial Path	Elm Creek	OK	Cushing Map Sheet 1
Stream / River	Goon Creek	OK	Cushing Map Sheet 1
Stream / River	Gray Branch	OK	Cushing Map Sheet 1
Stream / River	Hop Creek	OK	Cushing Map Sheet 1
Stream / River	Horseshoe Creek	OK	Cushing Map Sheet 1
Stream / River	Iowa Creek	OK	Cushing Map Sheet 1
Stream / River	Jones Creek	OK	Cushing Map Sheet 1
Stream / River	Joy Creek	OK	Cushing Map Sheet 1
Stream / River	Lane Branch	OK	Cushing Map Sheet 1
Stream / River	Little Blue River	OK	Cushing Map Sheet 1
Artificial Path	Little Blue River	OK	Cushing Map Sheet 1
Stream / River	Little Indian Creek	OK	Cushing Map Sheet 1
Stream / River	Meadow Creek	OK	Cushing Map Sheet 1
Stream / River	Melvin Creek	OK	Cushing Map Sheet 1
Stream / River	Mill Creek	OK	Cushing Map Sheet 1
Stream / River	Mill Creek	OK	Cushing Map Sheet 1
Stream / River	Mountain Creek	OK	Cushing Map Sheet 1
Stream / River	Plum Creek	OK	Cushing Map Sheet 1
Stream / River	Raemer Creek	OK	Cushing Map Sheet 1
Stream / River	Raemer Creek	OK	Cushing Map Sheet 1
Stream / River	Riddle Creek	OK	Cushing Map Sheet 1
Stream / River	Rock Creek	OK	Cushing Map Sheet 1
Stream / River	Rose Creek	OK	Cushing Map Sheet 1

Stream / River	Salt Creek	OK	Cushing Map Sheet 1
Stream / River	School Creek	OK	Cushing Map Sheet 1
Connector	School Creek	OK	Cushing Map Sheet 1
Artificial Path	School Creek	OK	Cushing Map Sheet 1
Stream / River	Sicily Creek	OK	Cushing Map Sheet 1
Artificial Path	Sicily Creek	OK	Cushing Map Sheet 1
Stream / River	Sicily Creek	OK	Cushing Map Sheet 1
Stream / River	Silver Creek	OK	Cushing Map Sheet 1
Stream / River	Smith Creek	OK	Cushing Map Sheet 1
Stream / River	Spring Creek	OK	Cushing Map Sheet 1
Artificial Path	Spring Creek	OK	Cushing Map Sheet 1
Stream / River	Stub Creek	OK	Cushing Map Sheet 1
Stream / River	Turkey Creek	OK	Cushing Map Sheet 1
Stream / River	Walnut Creek	OK	Cushing Map Sheet 1
Stream / River	Whisky Run	OK	Cushing Map Sheet 1
Artificial Path	Arkansas River	OK	Cushing Map Sheet 10
Stream / River	Black Bear Creek	OK	Cushing Map Sheet 10
Artificial Path	Boomer Creek	OK	Cushing Map Sheet 10
Stream / River	Boomer Creek	OK	Cushing Map Sheet 10
Stream / River	Brush Creek	OK	Cushing Map Sheet 10
Artificial Path	Brush Creek	OK	Cushing Map Sheet 10
Stream / River	Camp Creek	OK	Cushing Map Sheet 10
Stream/River	Cat Creek	OK	Cushing Map Sheet 10
Stream/River	Coal Creek	OK	Cushing Map Sheet 10
Stream/River	Coon Creek	OK	Cushing Map Sheet 10
Stream/River	Cottonwood Creek	OK	Cushing Map Sheet 10
Stream / River	Council Creek	OK	Cushing Map Sheet 10
Stream / River	Cow Creek	OK	Cushing Map Sheet 10
Stream / River	Dry Creek	OK	Cushing Map Sheet 10
Stream / River	Eagle Creek	OK	Cushing Map Sheet 10
Stream / River	East Brush Creek	OK	Cushing Map Sheet 10
Stream / River	Elm Creek	OK	Cushing Map Sheet 10
Stream / River	Feather Creek	OK	Cushing Map Sheet 10
Stream/River	Greasy Creek	OK	Cushing Map Sheet 10
Artificial Path	Greasy Creek	OK	Cushing Map Sheet 10
Stream/River	Houston Creek	OK	Cushing Map Sheet 10
Stream / River	Lagoon Creek	OK	Cushing Map Sheet 10
Stream / River	Lion Creek	OK	Cushing Map Sheet 10
Stream / River	Little Skedee Creek	OK	Cushing Map Sheet 10
Stream / River	Long Branch	OK	Cushing Map Sheet 10
Artificial Path	Mud Creek	OK	Cushing Map Sheet 10

Stream/River	Mud Creek	OK	Cushing Map Sheet 10
Stream / River	Mule Creek	OK	Cushing Map Sheet 10
Artificial Path	Mule Creek	OK	Cushing Map Sheet 10
Stream / River	North Stillwater Creek	OK	Cushing Map Sheet 10
Stream / River	Oak Creek	OK	Cushing Map Sheet 10
Artificial Path	Otoe Creek	OK	Cushing Map Sheet 10
Stream / River	Panther Creek	OK	Cushing Map Sheet 10
Stream / River	Pepper Creek	OK	Cushing Map Sheet 10
Stream / River	Peters Creek	OK	Cushing Map Sheet 10
Stream/River	Red Rock Creek	OK	Cushing Map Sheet 10
Artificial Path	Rock Creek	OK	Cushing Map Sheet 10
Artificial Path	Salt Creek	OK	Cushing Map Sheet 10
Stream / River	Salt Creek	OK	Cushing Map Sheet 10
Stream/River	Skedee Creek	OK	Cushing Map Sheet 10
Artificial Path	Skedee Creek	OK	Cushing Map Sheet 10
Stream/River	Skinny Creek	OK	Cushing Map Sheet 10
Stream / River	Spring Creek	OK	Cushing Map Sheet 10
Stream / River	Stillwater Creek	OK	Cushing Map Sheet 10
Artificial Path	Turkey Creek	OK	Cushing Map Sheet 10
Artificial Path	Walker Creek	OK	Cushing Map Sheet 10
Stream/River	Walker Creek	OK	Cushing Map Sheet 10
Stream / River	West Brush Creek	OK	Cushing Map Sheet 10
Stream / River	Willow Creek	OK	Cushing Map Sheet 10
Stream / River	Beaver Creek	OK	Cushing Map Sheet 11
Artificial Path	Big Creek	OK	Cushing Map Sheet 11
Stream / River	Big Creek	OK	Cushing Map Sheet 11
Artificial Path	Brush Creek	OK	Cushing Map Sheet 11
Stream / River	Brush Creek	OK	Cushing Map Sheet 11
Stream / River	Buckeye Creek	OK	Cushing Map Sheet 11
Artificial Path	Cabin Creek	OK	Cushing Map Sheet 11
Stream / River	Cabin Creek	OK	Cushing Map Sheet 11
Stream / River	Catfish Creek	OK	Cushing Map Sheet 11
Artificial Path	Catfish Creek	OK	Cushing Map Sheet 11
Stream / River	Chuckaho Creek	OK	Cushing Map Sheet 11
Artificial Path	Cimarron Creek	OK	Cushing Map Sheet 11
Stream / River	Cottonwood Creek	OK	Cushing Map Sheet 11
Artificial Path	Council Creek	OK	Cushing Map Sheet 11
Artificial Path	Deer Creek	OK	Cushing Map Sheet 11
Stream / River	Deer Creek	OK	Cushing Map Sheet 11
Stream / River	Dog Creek	OK	Cushing Map Sheet 11
Stream / River	Dry Creek	OK	Cushing Map Sheet 11

Stream / River	Dry Creek	OK	Cushing Map Sheet 11
Stream / River	Dugout Creek	OK	Cushing Map Sheet 11
Artificial Path	Dugout Creek	OK	Cushing Map Sheet 11
Stream / River	Eagle Creek	OK	Cushing Map Sheet 11
Stream / River	East Beaver Creek	OK	Cushing Map Sheet 11
Stream / River	East Fork Sand Creek	OK	Cushing Map Sheet 11
Stream / River	East Spring Creek	OK	Cushing Map Sheet 11
Artificial Path	East Spring Creek	OK	Cushing Map Sheet 11
Stream / River	Elm Creek	OK	Cushing Map Sheet 11
Stream / River	Euchee Creek	OK	Cushing Map Sheet 11
Artificial Path	Euchee Creek	OK	Cushing Map Sheet 11
Stream / River	Fourmile Creek	OK	Cushing Map Sheet 11
Stream / River	Gray Horse Creek	OK	Cushing Map Sheet 11
Artificial Path	Headquarters Creek	OK	Cushing Map Sheet 11
Stream / River	Headquarters Creek	OK	Cushing Map Sheet 11
Stream / River	Lagoon Creek	OK	Cushing Map Sheet 11
Stream / River	Lily Creek	OK	Cushing Map Sheet 11
Stream / River	Little Catfish Creek	OK	Cushing Map Sheet 11
Artificial Path	Little Catfish Creek	OK	Cushing Map Sheet 11
Stream / River	Little Deep Fork Creek	OK	Cushing Map Sheet 11
Artificial Path	Little Deep Fork Creek	OK	Cushing Map Sheet 11
Stream / River	Little Stillwater Creek	OK	Cushing Map Sheet 11
Stream / River	Long Branch	OK	Cushing Map Sheet 11
Artificial Path	Long Branch	OK	Cushing Map Sheet 11
Artificial Path	Mud Creek	OK	Cushing Map Sheet 11
Stream / River	Mud Creek	OK	Cushing Map Sheet 11
Stream / River	North Branch Ranch Creek	OK	Cushing Map Sheet 11
Stream / River	Polecat Creek	OK	Cushing Map Sheet 11
Stream / River	Possum Trot Creek	OK	Cushing Map Sheet 11
Stream / River	Ranch Creek	OK	Cushing Map Sheet 11
Stream / River	Rattlesnake Creek	OK	Cushing Map Sheet 11
Stream / River	Salt Creek	OK	Cushing Map Sheet 11
Artificial Path	Salt Creek	OK	Cushing Map Sheet 11
Stream / River	Sand Creek	OK	Cushing Map Sheet 11
Artificial Path	Sand Creek	OK	Cushing Map Sheet 11
Stream / River	Short Creek	OK	Cushing Map Sheet 11
Artificial Path	Short Creek	OK	Cushing Map Sheet 11
Artificial Path	Spring Creek	OK	Cushing Map Sheet 11
Stream / River	Spring Creek	OK	Cushing Map Sheet 11
Stream / River	Stillwater Creek	OK	Cushing Map Sheet 11
Artificial Path	Stillwater Creek	OK	Cushing Map Sheet 11

Stream / River	Swan Creek	OK	Cushing Map Sheet 11
Artificial Path	Tiger Creek	OK	Cushing Map Sheet 11
Stream / River	Tiger Creek	OK	Cushing Map Sheet 11
Artificial path	Turkey Creek	OK	Cushing Map Sheet 11
Stream / River	Turkey Creek	OK	Cushing Map Sheet 11
Artificial Path	Walnut Creek	OK	Cushing Map Sheet 11
Stream / River	Walnut Creek	OK	Cushing Map Sheet 11
Stream / River	West Beaver Creek	OK	Cushing Map Sheet 11
Stream / River	West Spring Creek	OK	Cushing Map Sheet 11
Stream / River	Wild Horse Creek	OK	Cushing Map Sheet 11
Stream / River	Wildhorse Creek	OK	Cushing Map Sheet 11
Stream / River	Ash Creek	OK	Cushing Map Sheet 2
Stream / River	Beaver Creek	OK	Cushing Map Sheet 2
Stream / River	Bolling Creek	OK	Cushing Map Sheet 2
Stream / River	Buffalo Creek	OK	Cushing Map Sheet 2
Stream / River	Camp Creek	OK	Cushing Map Sheet 2
Stream / River	Carter Creek	OK	Cushing Map Sheet 2
Stream / River	Coon Creek	OK	Cushing Map Sheet 2
Stream / River	Dry Creek	OK	Cushing Map Sheet 2
Stream / River	East Branch Dry Creek	OK	Cushing Map Sheet 2
Connector	East Branch Dry Creek	OK	Cushing Map Sheet 2
Stream / River	East Branch Parsons Creek	OK	Cushing Map Sheet 2
Stream / River	East Fork Walnut Creek	OK	Cushing Map Sheet 2
Stream / River	Finney Creek	OK	Cushing Map Sheet 2
Stream / River	Goon Creek	OK	Cushing Map Sheet 2
Stream / River	Iowa Creek	OK	Cushing Map Sheet 2
Stream / River	Lane Branch	OK	Cushing Map Sheet 2
Stream / River	Lincoln Creek	OK	Cushing Map Sheet 2
Stream / River	Little Blue River	OK	Cushing Map Sheet 2
Stream / River	Malone Creek	OK	Cushing Map Sheet 2
Stream / River	Melvin Creek	OK	Cushing Map Sheet 2
Stream / River	Mercer Creek	OK	Cushing Map Sheet 2
Stream / River	Mill Creek	OK	Cushing Map Sheet 2
Stream / River	Mulberry Creek	OK	Cushing Map Sheet 2
Artificial Path	Mulberry Creek	OK	Cushing Map Sheet 2
Stream / River	North Fork Fancy Creek	OK	Cushing Map Sheet 2
Stream / River	North Otter Creek	OK	Cushing Map Sheet 2
Stream / River	Otter Creek	OK	Cushing Map Sheet 2
Artificial Path	Parsons Creek	OK	Cushing Map Sheet 2
Stream / River	Parsons Creek	OK	Cushing Map Sheet 2
Artificial Path	Republican River	OK	Cushing Map Sheet 2

Stream / River	School Branch	OK	Cushing Map Sheet 2
Artificial Path	Scribner Creek	OK	Cushing Map Sheet 2
Stream / River	Scribner Creek	OK	Cushing Map Sheet 2
Stream / River	Spring Creek	OK	Cushing Map Sheet 2
Stream / River	Sulphur Creek	OK	Cushing Map Sheet 2
Stream / River	Swede Creek	OK	Cushing Map Sheet 2
Stream / River	Walnut Creek	OK	Cushing Map Sheet 2
Stream / River	Walnut Creek	OK	Cushing Map Sheet 2
Stream / River	West Branch Mall Creek	OK	Cushing Map Sheet 2
Stream / River	West Fancy Creek	OK	Cushing Map Sheet 2
Stream / River	Chestnut Branch	OK	Cushing Map Sheet 3
Stream / River	Dry Creek	OK	Cushing Map Sheet 3
Stream / River	Finney Creek	OK	Cushing Map Sheet 3
Artificial Path	Finney Creek	OK	Cushing Map Sheet 3
Stream / River	Five Creek	OK	Cushing Map Sheet 3
Artificial Path	Fourmile Creek	OK	Cushing Map Sheet 3
Stream/River	Goose Creek	OK	Cushing Map Sheet 3
Artificial Path	Huntress Creek	OK	Cushing Map Sheet 3
Stream / River	Huntress Creek	OK	Cushing Map Sheet 3
Artificial Path	Kansas River	OK	Cushing Map Sheet 3
Artificial Path	Lincoln Creek	OK	Cushing Map Sheet 3
Stream / River	Lincoln Creek	OK	Cushing Map Sheet 3
Stream/River	Little Arkansas Creek	OK	Cushing Map Sheet 3
Stream / River	Mill Creek	OK	Cushing Map Sheet 3
Stream / River	North Branch Five Creek	OK	Cushing Map Sheet 3
Stream / River	Otter Creek	OK	Cushing Map Sheet 3
Stream / River	Pinkerton Branch	OK	Cushing Map Sheet 3
Artificial Path	Republican River	OK	Cushing Map Sheet 3
Connector	Republican River	OK	Cushing Map Sheet 3
Stream/River	Sevenmile Creek	OK	Cushing Map Sheet 3
Stream/River	Threemile Creek	OK	Cushing Map Sheet 3
Stream / River	Timber Creek	OK	Cushing Map Sheet 3
Stream / River	Walnut Creek	OK	Cushing Map Sheet 3
Stream / River	West Branch Mall Creek	OK	Cushing Map Sheet 3
Stream/River	Wildcat Creek	OK	Cushing Map Sheet 3
Stream/River	Wind Creek	OK	Cushing Map Sheet 3
Stream / River	Basket Creek	OK	Cushing Map Sheet 3
Stream / River	Chapman Creek	OK	Cushing Map Sheet 3
Stream / River	Chestnut Branch	OK	Cushing Map Sheet 3
Stream / River	Mud Creek	OK	Cushing Map Sheet 3
Stream / River	Pinkerton Branch	OK	Cushing Map Sheet 3

Stream / River	Reeder Branch Five Creek	OK	Cushing Map Sheet 3
Stream/River	Camp Creek	OK	Cushing Map Sheet 4
Stream/River	Carry Creek	OK	Cushing Map Sheet 4
Connector	Carry Creek	OK	Cushing Map Sheet 4
Stream/River	Chapman Creek	OK	Cushing Map Sheet 4
Stream/River	Clarks Creek	OK	Cushing Map Sheet 4
Stream / River	Clear Creek	OK	Cushing Map Sheet 4
Stream/River	Diamond Creek	OK	Cushing Map Sheet 4
Stream / River	Doyle Creek	OK	Cushing Map Sheet 4
Stream / River	East Holland Creek	OK	Cushing Map Sheet 4
Artificial Path	East Turkey Creek	OK	Cushing Map Sheet 4
Stream/River	East Turkey Creek	OK	Cushing Map Sheet 4
Stream / River	Holland Creek	OK	Cushing Map Sheet 4
Artificial Path	Holland Creek	OK	Cushing Map Sheet 4
Artificial Path	Kohls Creek	OK	Cushing Map Sheet 4
Stream/River	Kohls Creek	OK	Cushing Map Sheet 4
Stream/River	Lime Creek	OK	Cushing Map Sheet 4
Artificial Path	Lone Tree Creek	OK	Cushing Map Sheet 4
Stream/River	Lyon Creek	OK	Cushing Map Sheet 4
Artificial Path	Lyon Creek	OK	Cushing Map Sheet 4
Stream/River	Middle Branch	OK	Cushing Map Sheet 4
Artificial Path	Middle Branch	OK	Cushing Map Sheet 4
Stream / River	Middle Creek	OK	Cushing Map Sheet 4
Artificial Path	Mud Creek	OK	Cushing Map Sheet 4
Stream / River	Mud Creek	OK	Cushing Map Sheet 4
Stream/River	Mulberry Creek	OK	Cushing Map Sheet 4
Stream/River	Otter Creek	OK	Cushing Map Sheet 4
Stream/River	Schuler Branch	OK	Cushing Map Sheet 4
Artificial Path	Smokey Hill River	OK	Cushing Map Sheet 4
Stream/River	Threemile Creek	OK	Cushing Map Sheet 4
Artificial Path	Turkey Creek	OK	Cushing Map Sheet 4
Stream/River	Turkey Creek	OK	Cushing Map Sheet 4
Stream/River	West Branch Lyon Creek	OK	Cushing Map Sheet 4
Stream / River	Antelope Creek	OK	Cushing Map Sheet 5
Stream / River	Bruno Creek	OK	Cushing Map Sheet 5
Stream/River	Camp Creek	OK	Cushing Map Sheet 5
Stream / River	Catlin Creek	OK	Cushing Map Sheet 5
Stream/River	Cedar Creek	OK	Cushing Map Sheet 5
Stream / River	Clear Creek	OK	Cushing Map Sheet 5
Connector	Clear Creek	OK	Cushing Map Sheet 5
Stream/River	Coon Creek	OK	Cushing Map Sheet 5

Stream/River	Cottonwood Creek	OK	Cushing Map Sheet 5
Stream / River	Cottonwood River	OK	Cushing Map Sheet 5
Artificial Path	Cottonwood River	OK	Cushing Map Sheet 5
Stream / River	Cress Creek	OK	Cushing Map Sheet 5
Stream/River	Diamond Creek	OK	Cushing Map Sheet 5
Stream / River	Doyle Creek	OK	Cushing Map Sheet 5
Stream / River	Doyle Creek	OK	Cushing Map Sheet 5
Stream / River	East Branch Clear Creek	OK	Cushing Map Sheet 5
Stream / River	East Branch Clear Creek	OK	Cushing Map Sheet 5
Stream / River	East Turkey Creek	OK	Cushing Map Sheet 5
Artificial Path	French Creek	OK	Cushing Map Sheet 5
Stream/River	French Creek	OK	Cushing Map Sheet 5
Stream / River	Lyon Creek	OK	Cushing Map Sheet 5
Stream / River	Lyon Creek	OK	Cushing Map Sheet 5
Stream / River	Martin Creek	OK	Cushing Map Sheet 5
Stream / River	Middle Branch	OK	Cushing Map Sheet 5
Artificial Path	Middle Branch	OK	Cushing Map Sheet 5
Stream/River	Middle Creek	OK	Cushing Map Sheet 5
Stream / River	Mud Creek	OK	Cushing Map Sheet 5
Stream/River	Mulberry Creek	OK	Cushing Map Sheet 5
Stream / River	Silver Creek	OK	Cushing Map Sheet 5
Stream / River	South Cottonwood River	OK	Cushing Map Sheet 5
Stream / River	Spring Branch	OK	Cushing Map Sheet 5
Stream/River	Spring Creek	OK	Cushing Map Sheet 5
Stream / River	Stony Brook	OK	Cushing Map Sheet 5
Stream/River	Stribby Creek	OK	Cushing Map Sheet 5
Stream/River	Turkey Creek	OK	Cushing Map Sheet 5
Stream/River	Badger Creek	OK	Cushing Map Sheet 6
Stream / River	Beaver Creek	OK	Cushing Map Sheet 6
Stream/River	Bills Creek	OK	Cushing Map Sheet 6
Stream/River	Bird Creek	OK	Cushing Map Sheet 6
Stream / River	Brush Creek	OK	Cushing Map Sheet 6
Stream/River	Cedar Creek	OK	Cushing Map Sheet 6
Stream/River	Cedar Creek	OK	Cushing Map Sheet 6
Stream / River	Chisholm Creek	OK	Cushing Map Sheet 6
Artificial Path	Constant Creek	OK	Cushing Map Sheet 6
Connector	Diamond Creek	OK	Cushing Map Sheet 6
Stream / River	Diamond Creek	OK	Cushing Map Sheet 6
Stream / River	Doyle Creek	OK	Cushing Map Sheet 6
Stream / River	Dry Creek	OK	Cushing Map Sheet 6

Stream / River	East Branch Whitewater Creek	OK	Cushing Map Sheet 6
Artificial Path	Elm Creek	OK	Cushing Map Sheet 6
Stream/River	Elm Creek	OK	Cushing Map Sheet 6
Stream / River	Fourmile Creek	OK	Cushing Map Sheet 6
Connector	Fourmile Creek	OK	Cushing Map Sheet 6
Artificial Path	Gilmore Branch	OK	Cushing Map Sheet 6
Stream/River	Gilmore Branch	OK	Cushing Map Sheet 6
Artificial Path	Gypsum Creek	OK	Cushing Map Sheet 6
Stream / River	Henry Creek	OK	Cushing Map Sheet 6
Stream/River	Middle Creek	OK	Cushing Map Sheet 6
Stream/River	Middle Fork Chisholm Creek	OK	Cushing Map Sheet 6
Stream/River	Prairie Creek	OK	Cushing Map Sheet 6
Stream / River	Rock Creek	OK	Cushing Map Sheet 6
Connector	Rock Creek	OK	Cushing Map Sheet 6
Artificial Path	Sand Creek	OK	Cushing Map Sheet 6
Stream / River	Sand Creek	OK	Cushing Map Sheet 6
Stream / River	Spring Branch	OK	Cushing Map Sheet 6
Connector	Spring Branch	OK	Cushing Map Sheet 6
Artificial Path	Spring Branch	OK	Cushing Map Sheet 6
Stream / River	Spring Creek	OK	Cushing Map Sheet 6
Stream/River	Sutton Creek	OK	Cushing Map Sheet 6
Stream/River	Turkey Creek	OK	Cushing Map Sheet 6
Artificial Path	Walnut Creek	OK	Cushing Map Sheet 6
Stream/River	Walnut Creek	OK	Cushing Map Sheet 6
Artificial Path	Walnut Creek	OK	Cushing Map Sheet 6
Stream/River	Walnut River	OK	Cushing Map Sheet 6
Stream / River	West Branch Walnut River	OK	Cushing Map Sheet 6
Artificial Path	West Branch Walnut River	OK	Cushing Map Sheet 6
Artificial Path	West Branch Whitewater River	OK	Cushing Map Sheet 6
Stream / River	West Branch Whitewater River	OK	Cushing Map Sheet 6
Artificial Path	West Wildcat Creek	OK	Cushing Map Sheet 6
Artificial Path	Whitewater Creek	OK	Cushing Map Sheet 6
Stream/River	Whitewater Creek	OK	Cushing Map Sheet 6
Artificial Path	Whitewater River	OK	Cushing Map Sheet 6
Stream / River	Whitewater River	OK	Cushing Map Sheet 6
Stream / River	Wildcat Creek	OK	Cushing Map Sheet 6
Artificial Path	Arkansas Creek	OK	Cushing Map Sheet 7
Stream/River	Badger Creek	OK	Cushing Map Sheet 7
Artificial Path	Bitter Creek	OK	Cushing Map Sheet 7
Stream/River	Bitter Creek	OK	Cushing Map Sheet 7

Stream/River	Cedar Creek	OK	Cushing Map Sheet 7
Stream/River	Chigger Creek	OK	Cushing Map Sheet 7
Stream/River	Coon Creek	OK	Cushing Map Sheet 7
Stream/River	Cowskin Creek	OK	Cushing Map Sheet 7
Artificial Path	Cowskin Creek	OK	Cushing Map Sheet 7
Stream/River	Crooked Creek	OK	Cushing Map Sheet 7
Artificial Path	Dog Creek	OK	Cushing Map Sheet 7
Stream/River	Dog Creek	OK	Cushing Map Sheet 7
Artificial Path	Dry Creek	OK	Cushing Map Sheet 7
Stream/River	Durham Creek	OK	Cushing Map Sheet 7
Stream/River	Dutch Creek	OK	Cushing Map Sheet 7
Stream/River	Eightmile Creek	OK	Cushing Map Sheet 7
Artificial Path	Elm Creek	OK	Cushing Map Sheet 7
Stream/River	Elm Creek	OK	Cushing Map Sheet 7
Stream/River	Foos Creek	OK	Cushing Map Sheet 7
Stream/River	Fourmile Creek	OK	Cushing Map Sheet 7
Artificial Path	Fourmile Creek	OK	Cushing Map Sheet 7
Stream/River	Gypsum Creek	OK	Cushing Map Sheet 7
Stream/River	Hickory Creek	OK	Cushing Map Sheet 7
Stream/River	Little Dutch Creek	OK	Cushing Map Sheet 7
Stream/River	Little Walnut River	OK	Cushing Map Sheet 7
Stream/River	Lower Dutch Creek	OK	Cushing Map Sheet 7
Stream/River	Maple Creek	OK	Cushing Map Sheet 7
Artificial Path	Muddy Creek	OK	Cushing Map Sheet 7
Stream/River	Muddy Creek	OK	Cushing Map Sheet 7
Stream/River	Ninnescah River	OK	Cushing Map Sheet 7
Stream/River	Polecat Creek	OK	Cushing Map Sheet 7
Stream/River	Republican Creek	OK	Cushing Map Sheet 7
Artificial Path	Republican Creek	OK	Cushing Map Sheet 7
Stream/River	Richland Creek	OK	Cushing Map Sheet 7
Artificial Path	Richland Creek	OK	Cushing Map Sheet 7
Stream/River	Rock Creek	OK	Cushing Map Sheet 7
Stream/River	Salter Branch	OK	Cushing Map Sheet 7
Stream/River	Sanford Creek	OK	Cushing Map Sheet 7
Artificial Path	Short Creek	OK	Cushing Map Sheet 7
Stream/River	Spring Branch	OK	Cushing Map Sheet 7
Stream/River	Spring Creek	OK	Cushing Map Sheet 7
Artificial Path	Spring Creek	OK	Cushing Map Sheet 7
Stream/River	Stewart Creek	OK	Cushing Map Sheet 7
Artificial Path	Swisher Branch	OK	Cushing Map Sheet 7
Stream/River	Swisher Branch	OK	Cushing Map Sheet 7

Artificial Path	Timber Creek	OK	Cushing Map Sheet 7
Stream/River	Timber Creek	OK	Cushing Map Sheet 7
Stream/River	Turner Creek	OK	Cushing Map Sheet 7
Stream/River	Walnut Creek	OK	Cushing Map Sheet 7
Connector	Walnut River	OK	Cushing Map Sheet 7
Stream/River	Walnut River	OK	Cushing Map Sheet 7
Connector	Whitewater River	OK	Cushing Map Sheet 7
Stream/River	Whitewater River	OK	Cushing Map Sheet 7
Stream/River	Antelope Creek	OK	Cushing Map Sheet 8
Artificial Path	Arkansas Creek	OK	Cushing Map Sheet 8
Stream/River	Arkansas River	OK	Cushing Map Sheet 8
Stream/River	Badger Creek	OK	Cushing Map Sheet 8
Artificial Path	Beaver Creek	OK	Cushing Map Sheet 8
Stream/River	Beaver Creek	OK	Cushing Map Sheet 8
Stream/River	Big Badger Creek	OK	Cushing Map Sheet 8
Stream/River	Bitter Creek	OK	Cushing Map Sheet 8
Connector	Bitter Creek	OK	Cushing Map Sheet 8
Stream/River	Black Crook Creek	OK	Cushing Map Sheet 8
Stream/River	Cedar Creek	OK	Cushing Map Sheet 8
Stream/River	Chilcocco Creek	OK	Cushing Map Sheet 8
Connector	Chilcocco Creek	OK	Cushing Map Sheet 8
Artificial Path	Chilcocco Creek	OK	Cushing Map Sheet 8
Stream/River	Deer Creek	OK	Cushing Map Sheet 8
Stream/River	Dry Creek	OK	Cushing Map Sheet 8
Connector	Dutch Creek	OK	Cushing Map Sheet 8
Stream/River	Dutch Creek	OK	Cushing Map Sheet 8
Stream/River	East Badger Creek	OK	Cushing Map Sheet 8
Stream/River	East Bitter Creek	OK	Cushing Map Sheet 8
Stream/River	Eat Bitter Creek	OK	Cushing Map Sheet 8
Stream/River	Foos Creek	OK	Cushing Map Sheet 8
Stream/River	Harper Creek	OK	Cushing Map Sheet 8
Stream/River	Little Osage Creek	OK	Cushing Map Sheet 8
Stream/River	Lone Elm Creek	OK	Cushing Map Sheet 8
Artificial Path	Lost Creek	OK	Cushing Map Sheet 8
Stream/River	Lost Creek	OK	Cushing Map Sheet 8
Stream/River	Middle Bitter Creek	OK	Cushing Map Sheet 8
Artificial Path	Negro Creek	OK	Cushing Map Sheet 8
Stream/River	Negro Creek	OK	Cushing Map Sheet 8
Artificial Path	Ninnescah River	OK	Cushing Map Sheet 8
Stream/River	Ninnescah River	OK	Cushing Map Sheet 8
Stream/River	Osage Creek	OK	Cushing Map Sheet 8

Stream/River	Pebble Creek	OK	Cushing Map Sheet 8
Stream/River	Posey Creek	OK	Cushing Map Sheet 8
Stream/River	Salt Creek	OK	Cushing Map Sheet 8
Stream/River	Silver Creek	OK	Cushing Map Sheet 8
Stream/River	Slate Creek	OK	Cushing Map Sheet 8
Artificial Path	Slate Creek	OK	Cushing Map Sheet 8
Stream/River	Snake Creek	OK	Cushing Map Sheet 8
Stream/River	Spring Creek	OK	Cushing Map Sheet 8
Artificial Path	Spring Creek	OK	Cushing Map Sheet 8
Artificial Path	Walnut Creek	OK	Cushing Map Sheet 8
Stream/River	Walnut Creek	OK	Cushing Map Sheet 8
Artificial Path	Walnut River	OK	Cushing Map Sheet 8
Stream/River	Walnut River	OK	Cushing Map Sheet 8
Stream/River	West Badger Creek	OK	Cushing Map Sheet 8
Stream/River	Winser Creek	OK	Cushing Map Sheet 8
Artificial Path	Arkansas River	OK	Cushing Map Sheet 9
Stream/River	Arkansas River	OK	Cushing Map Sheet 9
Stream/River	Big Drum Creek	OK	Cushing Map Sheet 9
Artificial Path	Big Drum Creek	OK	Cushing Map Sheet 9
Stream/River	Bird Creek	OK	Cushing Map Sheet 9
Stream/River	Birds Nest Creek	OK	Cushing Map Sheet 9
Artificial Path	Birds Nest Creek	OK	Cushing Map Sheet 9
Stream/River	Bitter Creek	OK	Cushing Map Sheet 9
Artificial Path	Bois d'Arc Creek	OK	Cushing Map Sheet 9
Stream/River	Camp Creek	OK	Cushing Map Sheet 9
Artificial Path	Charley Creek	OK	Cushing Map Sheet 9
Artificial Path	Chikaskia River	OK	Cushing Map Sheet 9
Artificial Path	Coon Creek	OK	Cushing Map Sheet 9
Stream/River	Coon Creek	OK	Cushing Map Sheet 9
Artificial Path	Cowskin Creek	OK	Cushing Map Sheet 9
Stream/River	Deadman Creek	OK	Cushing Map Sheet 9
Artificial Path	Deadman Creek	OK	Cushing Map Sheet 9
Stream/River	Doe Creek	OK	Cushing Map Sheet 9
Stream/River	Dry Creek	OK	Cushing Map Sheet 9
Stream/River	Duck Creek	OK	Cushing Map Sheet 9
Stream/River	Duck Creek	OK	Cushing Map Sheet 9
Stream/River	East Cattle Creek	OK	Cushing Map Sheet 9
Stream/River	Grassy Creek	OK	Cushing Map Sheet 9
Artificial Path	Houston Creek	OK	Cushing Map Sheet 9
Stream/River	Houston Creek	OK	Cushing Map Sheet 9
Artificial Path	Little Drum Creek	OK	Cushing Map Sheet 9

Stream/River	Little Drum Creek	OK	Cushing Map Sheet 9
Stream/River	Long Branch	OK	Cushing Map Sheet 9
Stream/River	Lost Creek	OK	Cushing Map Sheet 9
Artificial Path	Prettyhair Creek	OK	Cushing Map Sheet 9
Stream/River	Red Rock Creek	OK	Cushing Map Sheet 9
Artificial Path	Salt Fork Arkansas River	OK	Cushing Map Sheet 9
Artificial Path	Scatter Creek	OK	Cushing Map Sheet 9
Stream/River	Scatter Creek	OK	Cushing Map Sheet 9
Artificial Path	Simpkins Creek	OK	Cushing Map Sheet 9
Stream/River	Simpkins Creek	OK	Cushing Map Sheet 9
Connector	Skinny Creek	OK	Cushing Map Sheet 9
Stream/River	Skinny Creek	OK	Cushing Map Sheet 9
Stream/River	Stink Creek	OK	Cushing Map Sheet 9
Stream/River	West Cattle Creek	OK	Cushing Map Sheet 9
Stream	Long Island Creek	TX	KHL ESM Map 1,Map 2
Stream	Abbott Creek	TX	KHL ESM Map 2
Stream	Redmond Creek	TX	KHL ESM Map 2
Stream	Turtle Bayou	TX	KHL ESM Map 2
Stream	Trinity River	TX	KHL ESM Map 2, Map 3
Stream	Old River	TX	KHL ESM Map 3
Stream	Cedar Bayou	TX	KHL ESM Map 3, Map 4
Stream	San Jacinto River	TX	KHL ESM Map 4
Steam	Euchee Creek	OK	U.S. Map Sheet 1
Steam	Lilly Creek	OK	U.S. Map Sheet 1
Stream	Pernbina River	ND	U.S. Map Sheet 1
Steam	Rattlesnake Creek	OK	U.S. Map Sheet 1
Steam	Salt Creek	OK	U.S. Map Sheet 1
Steam	Turkey Creek	OK	U.S. Map Sheet 1
Stream	Glade Creek	TX	U.S. Map Sheet 10
Stream	Hills Creek	TX	U.S. Map Sheet 10
Stream	Kay Creek	TX	U.S. Map Sheet 10
Stream	Mud Creek	SD	U.S. Map Sheet 10
Stream	Prairie Creek	TX	U.S. Map Sheet 10
Stream	Rogers Creek	TX	U.S. Map Sheet 10
Stream	Sabine River	TX	U.S. Map Sheet 10
Stream Intermittent		SD	U.S. Map Sheet 10
Stream	Autry Branch	TX	U.S. Map Sheet 11
Stream	Beaver Run	TX	U.S. Map Sheet 11
Stream	Boggy Branch	TX	U.S. Map Sheet 11
Stream	Campground Creek	TX	U.S. Map Sheet 11
Stream	Denton Creek	TX	U.S. Map Sheet 11

Stream Intermittent	Foster Creek	SD	U.S. Map Sheet 11
Stream	Grissom Creek	TX	U.S. Map Sheet 11
Stream	Hudspeth Creek	TX	U.S. Map Sheet 11
Stream	Indian Creek	TX	U.S. Map Sheet 11
Stream	Johnson Creek	TX	U.S. Map Sheet 11
Stream	Kickapoo Creek	TX	U.S. Map Sheet 11
Stream	Mill Creek	TX	U.S. Map Sheet 11
Stream	Striker Creek	TX	U.S. Map Sheet 11
Stream Intermittent		SD	U.S. Map Sheet 11
Stream	Angelina River	TX	U.S. Map Sheet 12
Stream	Beaver Creek	TX	U.S. Map Sheet 12
Stream	Beech Creek	TX	U.S. Map Sheet 12
Stream	Bingham Creek	TX	U.S. Map Sheet 12
Stream	Doyle Creek	TX	U.S. Map Sheet 12
Stream	Legg Creek	TX	U.S. Map Sheet 12
Stream Intermittent	Pearl Creek	SD	U.S. Map Sheet 12
Stream	Red Bayou	TX	U.S. Map Sheet 12
Stream Intermittent	South Pearl Creek	SD	U.S. Map Sheet 12
Stream	Stokes Creek	TX	U.S. Map Sheet 12
Stream	Watson Branch	TX	U.S. Map Sheet 12
Stream Intermittent	West Redstone Creek	SD	U.S. Map Sheet 12
Stream Intermittent		SD	U.S. Map Sheet 12
Stream	Bear Creek	TX	U.S. Map Sheet 13
Stream	Buncombe Creek	TX	U.S. Map Sheet 13
Stream	Crawford Creek	TX	U.S. Map Sheet 13
Stream	Dry Creek	TX	U.S. Map Sheet 13
Stream	Durham Creek	TX	U.S. Map Sheet 13
Stream	Hackberry Creek	TX	U.S. Map Sheet 13
Stream Intermittent	Jim Creek	SD	U.S. Map Sheet 13
Stream	Lower Sulphur Creek	TX	U.S. Map Sheet 13
Stream	McManus Creek	TX	U.S. Map Sheet 13
Stream	Moccasin Creek	TX	U.S. Map Sheet 13
Stream	Neches River	TX	U.S. Map Sheet 13
Stream	Piney Creek	TX	U.S. Map Sheet 13
Stream Intermittent	Redstone Creek	SD	U.S. Map Sheet 13
Stream Intermittent	Rock Creek	SD	U.S. Map Sheet 13
Stream	Sandy Branch	TX	U.S. Map Sheet 13
Stream	White Oak Creek	TX	U.S. Map Sheet 13
Stream	Zed Creek	TX	U.S. Map Sheet 13
Stream	Beech Creek	TX	U.S. Map Sheet 14
Stream	Big Sandy Creek	TX	U.S. Map Sheet 14

Stream	Bluff Creek	TX	U.S. Map Sheet 14
Stream	Brushy Creek	TX	U.S. Map Sheet 14
Stream	Bundix Branch	TX	U.S. Map Sheet 14
Stream	Dry Branch	TX	U.S. Map Sheet 14
Stream	Johnson Creek	TX	U.S. Map Sheet 14
Stream	Kennedy Creek	TX	U.S. Map Sheet 14
Stream	Mathis Creek	TX	U.S. Map Sheet 14
Stream	Menard Creek	TX	U.S. Map Sheet 14
Stream Intermittent	Wolf Creek	SD	U.S. Map Sheet 14
Stream	Yellow Branch	TX	U.S. Map Sheet 14
Stream	Batiste Creek	TX	U.S. Map Sheet 15
Stream	Beef Head Creek	TX	U.S. Map Sheet 15
Stream	James River	SD	U.S. Map Sheet 15
Stream	Trinity River	TX	U.S. Map Sheet 15
Stream	Williams Creek	TX	U.S. Map Sheet 15
Stream Intermittent	Beaver Creek	SD	U.S. Map Sheet 16
Stream	Cotton Creek	TX	U.S. Map Sheet 16
Stream	James Creek	SD	U.S. Map Sheet 16
Stream	Mayhawk Creek	TX	U.S. Map Sheet 16
Stream	Pine Island Bayou	TX	KHL ESM Map 5 (Citgo Lateral) U.S. Map Sheet 16
Stream	Six-Ten Slough	TX	U.S. Map Sheet 16
Stream	West Bow Creek	NE	U.S. Map Sheet 16
Stream	West End Slough	TX	U.S. Map Sheet 16
Stream	Bird Island Bayou	TX	U.S. Map Sheet 17
Stream	Bow Creek	NE	U.S. Map Sheet 17
Stream	Dog Creek	NE	U.S. Map Sheet 17
Stream	Grays Bayou	TX	U.S. Map Sheet 17
Stream	Middle Logan Creek	NE	U.S. Map Sheet 17
Stream	Neches River	TX	U.S. Map Sheet 17
Stream	Willow Marsh Bayou	TX	U.S. Map Sheet 17
Stream	Elk Horn River	NE	U.S. Map Sheet 18
Stream	Union Creek	NE	U.S. Map Sheet 18
Stream	Lost Creek	NE	U.S. Map Sheet 19
Stream	Shell Creek	NE	U.S. Map Sheet 19
Stream	West Fork Maple Creek	NE	U.S. Map Sheet 19
Stream	Cart Creek	ND	U.S. Map Sheet 2
Steam	Little Hilliby Creek	OK	U.S. Map Sheet 2
Stream	Middle Branch Park River	ND	U.S. Map Sheet 2
Stream	North Branch Park River	ND	U.S. Map Sheet 2
Steam	North Canadian River	OK	U.S. Map Sheet 2

Stream	South Branch Park River	ND	U.S. Map Sheet 2
Stream	Tongue River	ND	U.S. Map Sheet 2
Stream	Big Blue River	NE	U.S. Map Sheet 20
Stream	North Branch Big Blue River	NE	U.S. Map Sheet 20
Stream	Lincoln Creek	NE	U.S. Map Sheet 21
Stream	Turkey Creek	NE	U.S. Map Sheet 21
Stream	West Fork Big Blue River	NE	U.S. Map Sheet 21
Stream Intermittent	Cub Creek	NE	U.S. Map Sheet 22
Stream	Swan Creek	NE	U.S. Map Sheet 22
Stream Intermittent	Big Indian Creek	NE	U.S. Map Sheet 23
Stream	Big Indian Creek	NE	U.S. Map Sheet 23
Stream	Little Blue River	NE	U.S. Map Sheet 23
Stream	Little Blue River	KS	U.S. Map Sheet 23
Stream	Big Blue River	KS	U.S. Map Sheet 24
Stream	Horseshoe Creek	KS	U.S. Map Sheet 24
Stream	Robidoux Creek	KS	U.S. Map Sheet 24
Stream Intermittent	Craig Creek	KS	U.S. Map Sheet 25
Stream	Delaware River	KS	U.S. Map Sheet 25
Stream	South Fork Big Nemaha River	KS	U.S. Map Sheet 25
Stream	Independence Creek	KS	U.S. Map Sheet 26
Stream	Walnut Creek	KS	U.S. Map Sheet 26
Stream	Wolf River	KS	U.S. Map Sheet 26
Stream	Platte River	MO	U.S. Map Sheet 27
Stream	Castile Creek	MO	U.S. Map Sheet 28
Stream	Little Platte River	MO	U.S. Map Sheet 28
Stream	Shoal Creek	MO	U.S. Map Sheet 28
Stream	Mud Creek	MO	U.S. Map Sheet 29
Stream	Shoal Creek	MO	U.S. Map Sheet 29
Stream	Turkey Creek	MO	U.S. Map Sheet 29
Steam	Arbeca Creek	OK	U.S. Map Sheet 3
Steam	Big Wewoka Creek	OK	U.S. Map Sheet 3
Steam	Bird Creek	OK	U.S. Map Sheet 3
Steam	Canadian River	OK	U.S. Map Sheet 3
Steam	Jacobs Creek	OK	U.S. Map Sheet 3
Steam	Little Wewoka Creek	OK	U.S. Map Sheet 3
Stream	Middle Branch Forest River	ND	U.S. Map Sheet 3
Stream Intermittent	North Branch Turtle River	ND	U.S. Map Sheet 3
Steam	Sand Creek	OK	U.S. Map Sheet 3
Stream Intermittent	Skunk Coulee	ND	U.S. Map Sheet 3
Stream	South Branch Forest River	ND	U.S. Map Sheet 3
Steam	Wewoka Creek	OK	U.S. Map Sheet 3

Stream		ND	U.S. Map Sheet 3
Stream	Big Creek	MO	U.S. Map Sheet 30
Stream	Grand River	MO	U.S. Map Sheet 30
Stream	Grand River	MO	U.S. Map Sheet 30
Stream	Chariton River	MO	U.S. Map Sheet 31
Stream	East Fork Little Chariton River	MO	U.S. Map Sheet 31
Stream	Middle Fork Little Chariton River	MO	U.S. Map Sheet 31
Stream	Mussel Fork	MO	U.S. Map Sheet 31
Stream	Old Channel Chariton River	MO	U.S. Map Sheet 31
Stream	Coon Creek	MO	U.S. Map Sheet 32
Stream	Long Branch	MO	U.S. Map Sheet 32
Stream	Reese Fork	MO	U.S. Map Sheet 32
Stream	Saling Creek	MO	U.S. Map Sheet 32
Stream	Youngs Creek	MO	U.S. Map Sheet 32
Stream	Littleby Creek	MO	U.S. Map Sheet 33
Stream	South Fork Salt River	MO	U.S. Map Sheet 33
Stream	West Fork Cuivre River	MO	U.S. Map Sheet 33
Stream	Elkhorn Creek	MO	U.S. Map Sheet 34
Stream	West Fork Cuivre River	MO	U.S. Map Sheet 34
Steam	Big Creek	MO	U.S. Map Sheet 35
Stream	Cuivre River	MO	U.S. Map Sheet 35
Stream	Cuivre Slough	MO	U.S. Map Sheet 35
Stream	Dardenne Creek	MO	U.S. Map Sheet 35
Steam	Peruque Creek	MO	U.S. Map Sheet 35
Stream		MO	U.S. Map Sheet 35
Stream	Brick House Slough	MO	U.S. Map Sheet 36
Steam	Cahokia Creek	IL	U.S. Map Sheet 36
Stream	Cora Island Chute	MO	U.S. Map Sheet 36
Dam	Dam Number 27	MO	U.S. Map Sheet 36
Steam	Indian Creek	IL	U.S. Map Sheet 36
Dam	Lock and dam Number 26	MO	U.S. Map Sheet 36
Steam	Beaver Creek	IL	U.S. Map Sheet 37
Steam	East Fork Silver Creek	IL	U.S. Map Sheet 37
Steam	Shoal Creek	IL	U.S. Map Sheet 37
Steam	Silver Creek	IL	U.S. Map Sheet 37
Steam	Sugar Creek	IL	U.S. Map Sheet 37
Steam	North Fork Kaskaskia Creek	IL	U.S. Map Sheet 38
Steam	Big Sandy Creek	OK	U.S. Map Sheet 4
Steam	Coon Creek	OK	U.S. Map Sheet 4
Stream Intermittent	Goose Creek	ND	U.S. Map Sheet 4
Stream	Goose River	ND	U.S. Map Sheet 4

Steam	Little Caney Boggy Creek	OK	U.S. Map Sheet 4
Steam	Little Sandy Creek	OK	U.S. Map Sheet 4
Steam	Owl Creek	OK	U.S. Map Sheet 4
Steam	Peach Creek	OK	U.S. Map Sheet 4
Steam	Sandy Creek	OK	U.S. Map Sheet 4
Steam	Clear Boggy Creek	OK	U.S. Map Sheet 5
Steam	Cowpen Creek	OK	U.S. Map Sheet 5
Steam	French Henry Creek	OK	U.S. Map Sheet 5
Steam	Fronter House Creek	OK	U.S. Map Sheet 5
Steam	Little Cowpen Creek	OK	U.S. Map Sheet 5
Steam	Long Branch	OK	U.S. Map Sheet 5
Steam	Pine Creek	OK	U.S. Map Sheet 5
Steam	Straight Creek	OK	U.S. Map Sheet 5
Steam	Cowpen Creek	OK	U.S. Map Sheet 6
Steam	McGee Creek	OK	U.S. Map Sheet 6
Stream	Red River	TX	U.S. Map Sheet 6
Steam	Rock Branch	OK	U.S. Map Sheet 6
Steam	Sassafras Creek	OK	U.S. Map Sheet 6
Stream	Slash Creek	OK	U.S. Map Sheet 6
Stream	Slough Creek	TX	U.S. Map Sheet 6
Steam	Straight Creek	OK	U.S. Map Sheet 6
Steam	Sulphur Creek	OK	U.S. Map Sheet 6
Stream	Whitegrass Creek	OK	U.S. Map Sheet 6
Stream	Whitesand Creek	OK	U.S. Map Sheet 6
Stream	Winter Creek	OK	U.S. Map Sheet 6
Stream	Wolf Creek	OK	U.S. Map Sheet 6
Stream	Bergher Creek	TX	U.S. Map Sheet 7
Stream	Cherry Creek	TX	U.S. Map Sheet 7
Stream	Cottonwood Creek	TX	U.S. Map Sheet 7
Stream	Doss Creek	TX	U.S. Map Sheet 7
Stream	Justiss Creek	TX	U.S. Map Sheet 7
Stream	Lake Creek	TX	U.S. Map Sheet 7
Stream	Mallory Creek	TX	U.S. Map Sheet 7
Stream	Maxey Creek	TX	U.S. Map Sheet 7
Stream	Maxwell Creek	TX	U.S. Map Sheet 7
Stream	McGuyer Branch	TX	U.S. Map Sheet 7
Stream	Robertson Creek	TX	U.S. Map Sheet 7
Stream	Sanders Creek	TX	U.S. Map Sheet 7
Stream	Sheyenne River	ND	U.S. Map Sheet 7
Stream	West Fork Cottonwood Creek	TX	U.S. Map Sheet 7
Stream	Briar Branch	TX	U.S. Map Sheet 8

Stream	Crosstimber Creek	TX	U.S. Map Sheet 8
Stream	Greenwood Creek	TX	U.S. Map Sheet 8
Stream	Huggins Creek	TX	U.S. Map Sheet 8
Stream	Little Cypress Creek	TX	U.S. Map Sheet 8
Stream	South Sulphur River	TX	U.S. Map Sheet 8
Stream	Stouts Creek	TX	U.S. Map Sheet 8
Stream	Wolfpen Creek	TX	U.S. Map Sheet 8
Stream Intermittent	Antelope Creek	SD	U.S. Map Sheet 9
Stream	Blue Branch	TX	U.S. Map Sheet 9
Stream	Briary Creek	TX	U.S. Map Sheet 9
Stream	Brushy Creek	TX	U.S. Map Sheet 9
Stream	Coon Creek	TX	U.S. Map Sheet 9
Stream Intermittent	Crow Creek	ND	U.S. Map Sheet 9
Stream	Gin Creek	TX	U.S. Map Sheet 9
Stream	Glade Branch	TX	U.S. Map Sheet 9
Stream	Mill Creek	TX	U.S. Map Sheet 9
Stream	Ready Creek	TX	U.S. Map Sheet 9
Stream Intermittent		SD	U.S. Map Sheet 9

Canadian Populated Areas

Place ID	Providence	Geoname	Consice	Map Sheet
581	Manitoba	Reinland	Unincorporated Area	Ca. Map Sheet 28
611	Manitoba	Brookedale	Unincorporated Area	Ca. Map Sheet 23
1230	Saskatchewan	Caronport	Village	Ca. Map Sheet 13
2456	Manitoba	Miniota	Unincorporated Area	Ca. Map Sheet 21

Canadian Manufacturing Waterwells

Well_ID	Well_Owner	Aquifer	Well_Use	Map Sheet
110879	G Neufeld	Sand and Gravel	Production	Ca. Map Sheet 26
120590	T Barber	Sand and Gravel	Production	Ca. Map Sheet 26
120592	Unknown	Sand and Gravel	Production	Ca. Map Sheet 26
120639	Unknown	Shale	Production	Ca. Map Sheet 26
120885	Unknown	Sand and Gravel	Production	Ca. Map Sheet 26
120887	S Moffat	Limestone or Dolomite	Production	Ca. Map Sheet 26
160562	Robinson	Sand and Gravel	Production	Ca. Map Sheet 27
160564	Robinson & McClomnel	Sand and Gravel	Production	Ca. Map Sheet 27
181435	Unknown	Shale	Production	Ca. Map Sheet 25
210553	J Swanton	Sand and Gravel	Production	Ca. Map Sheet 27

Canadian Municipal Wells

Water Use	Well Use	Sask_ID	Map Sheet

Municipal	Water Test Hole	7403	Ca. Map Sheet 17
Municipal	Water Test Hole	26975	Ca. Map Sheet 13
Municipal	Withdrawal	28444	Ca. Map Sheet 10
Municipal	Water Test Hole	28445	Ca. Map Sheet 10
Municipal	Water Test Hole	28446	Ca. Map Sheet 10
Municipal	Water Test Hole	28447	Ca. Map Sheet 10
Municipal	Water Test Hole	28448	Ca. Map Sheet 10
Municipal	Withdrawal	28449	Ca. Map Sheet 10
Municipal	Water Test Hole	28450	Ca. Map Sheet 10
Municipal	Observation	28451	Ca. Map Sheet 10
Municipal	Water Test Hole	28452	Ca. Map Sheet 10
Municipal	Withdrawal	28453	Ca. Map Sheet 10
Municipal	Observation	28454	Ca. Map Sheet 10
Municipal	Water Test Hole	31129	Ca. Map Sheet 7
Municipal	Withdrawal	77323	Ca. Map Sheet 10

Canadian Lakes

Name	Lake_ID	Map Sheet
Chaplin Lake	Chaplin Lake (ID956)	Ca. Map Sheet 12

Canadian Rivers and Streams

Name	Map Sheet
Battle River	Ca. Map Sheet 1
Battle River	Ca. Map Sheet 1
Ribstone Creek	Ca. Map Sheet 2
Monitor Creek	Ca. Map Sheet 3
Sounding Creek	Ca. Map Sheet 4
Alkali Creek	Ca. Map Sheet 5
Alkali Creek	Ca. Map Sheet 5
Red Deer Creek	Ca. Map Sheet 6
South Saskatchewan River	Ca. Map Sheet 7
Miry Creek	Ca. Map Sheet 9
Thunder Creek	Ca. Map Sheet 13
9787107	Ca. Map Sheet 13
Thunder Creek	Ca. Map Sheet 13
Swift Current Creek	Ca. Map Sheet 11
Moose Jaw River	Ca. Map Sheet 14
Wascana Creek	Ca. Map Sheet 15
Thunder Creek	Ca. Map Sheet 13
10656107	Ca. Map Sheet 15
Pipestone Creek	Ca. Map Sheet 18
11701107	Ca. Map Sheet 20
Pipestone Creek	Ca. Map Sheet 18

11948107	Ca. Map Sheet 19
Arrow River	Ca. Map Sheet 21
12233107	Ca. Map Sheet 21
Assiniboine River	Ca. Map Sheet 21
Boggy Creek	Ca. Map Sheet 23
12527107	Ca. Map Sheet 21
Little Saskatchewan River	Ca. Map Sheet 22
12589107	Ca. Map Sheet 21
Oak River	Ca. Map Sheet 22
Whitemud River	Ca. Map Sheet 23
13019107	Ca. Map Sheet 24
13199107	Ca. Map Sheet 24
12959107	Ca. Map Sheet 22
Assiniboine River	Ca. Map Sheet 25
Assiniboine River	Ca. Map Sheet 25
13416107	Ca. Map Sheet 24
13333107	Ca. Map Sheet 24
13577107	Ca. Map Sheet 25
13379107	Ca. Map Sheet 23
13826107	Ca. Map Sheet 25
Assiniboine River	Ca. Map Sheet 25
Boyne River	Ca. Map Sheet 27
Boyne River	Ca. Map Sheet 27
Boyne River	Ca. Map Sheet 27
14914107	Ca. Map Sheet 27
14990107	Ca. Map Sheet 27
15172107	Ca. Map Sheet 27
15266107	Ca. Map Sheet 27
15321107	Ca. Map Sheet 27
15329107	Ca. Map Sheet 27
15606107	Ca. Map Sheet 28
15601107	Ca. Map Sheet 27
15776107	Ca. Map Sheet 28
15867107	Ca. Map Sheet 28
16006107	Ca. Map Sheet 28
16034107	Ca. Map Sheet 28

Figure 6.5 Drain Tiles

Consideration needs to be given to the presence of drain tiles and how they could provide a hydraulic conduit for the migration of the product off the right of way.

Figure 6.6 Reference Websites

The following is a list of websites that can be used as reference material during an incident.

Canada

- Canada - United States Joint Inland Pollution Contingency Plan - Annex II http://www.epa.gov/oem/docs/chem/canusplain.pdf
- CA National Environmental Emergencies Contingency Plan http://ec.gc.ca/ee-ue/default.asp?lang=en&n=CC95B410

United States

- U.S. National Oil and Hazardous Substances Pollution Contingency Plan (NCP) https://www.gpo.gov/fdsys/pkg/CFR-2015-title40-vol28/xml/CFR-2015-title40-vol28-part300.xml
    - EPA Region 5 - Regional Contingency Plan http://www.rrt5.org/RCPACPMain.aspx
    - EPA Region 6 - Regional Contingency Plan http://www.rrt6.org/ResponsePlans.aspx
        - Sector Houston Galveston Area Contingency/Central Texas Coastal Area Contingency Plan http://www.rrt6.org/Uploads/Files/sectorhoustongalveston_acp%20-%202013.pdf
        - Southeast Texas and Southwest Louisiana Area Contingency Plan http://www.rrt6.org/Uploads/Files/msuportarthur_acp%20-%202013.pdf
    - EPA Region 7 - Regional Contingency Plan https://response.epa.gov/site/doc_list.aspx?site_id=6065
        - Siouxland Sub-Area Contingency Plan
        - Greater St. Louis Sub-Area Plan https://response.epa.gov/sites/6065/files/Siouxland%20SACP_Public%20Version_Feb-2016.pdf
        - https://www.epaosc.org/sites/6065/files/GSL%20SACP_public%20access_Sept-2013.pdf
    - EPA Region 8 - Regional Contingency Plan https://www.nrt.org/site/site_profile.aspx?site_id=32

APPENDIX A Response Equipment and Resources

A-1 Company Owned Response Equipment

The Company owns and operates oil spill response equipment contained within response trailers staged throughout the pipeline system. This equipment is maintained according to manufacturer's recommendations by Company and/or contracted personnel. An equipment summary detailing locations, type and amount stored in the response trailers is listed in Figure A.4. The Company also has contracts in place with Oil Spill Removal Organizations and other clean-up contractors that are capable of responding to all discharges along the Pipeline. Figure A.2 lists the contracted Oil Spill Removal Organizations.

Equipment trailers are located at strategic points along the pipeline. The location of each trailer is listed in the response zone annex. The equipment inventory for each trailer is listed in Figure A.4.

The Qualified Individual has the authority to activate other private contractors, experts, and consultants as the situation demands.

All Pipeline personnel who might be involved in an oil spill have been informed that detergents or other surfactants are prohibited from being used on an oil spill in the water and that dispersants can only be used with the approval of the Canadian Regional Environmental Emergency Team (REET) or US Regional Response Team, the interagency group composed of Federal and State agency representatives that coordinates oil spill response.

A-2 Other Company Resources

Additional Company spill response equipment and manpower resources are not available to supplement the response operation; however, third party contractors will be activated on an as needed basis.

A-3 Contract Resources

The resources will be secured from a Company approved contractor. Management will typically handle notification/implementation of these resources. Figure A.2 provides a quick reference to the Oil Spill Removal Organizations and details their response capability and estimated response times. Telephone reference is provided in Figure 2.5.

!	**NOTE:** The Company will ensure each OSRO has a comprehensive maintenance program and applicable training / drills programs in place at contract renewal.

A-4 Cooperative/Mutual Aid Resources

TC Energy has entered multiple Response Assistance Agreement throughout Canada, with other industry partners to support each other as needed during complex incidents. A full listing of the current Response Assistance Agreements can be accessed through the Emergency Management 1TC page.

TC Energy is also a member of the following Oil Spill Cooperatives or mutual aid groups:

- ----------
- ----------
- ----------

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential vendor names and contact

A-5 Volunteers

Volunteers will not be utilized by the Company for the response operations. In the U.S., all volunteers will be referred to the Federal Regional Response Team.

A-6 Communications

Effective and efficient communications systems are essential for emergency response at every level. The communications system will be utilized to gather information and current status reports as well as to provide coordination and direction to widely separated work groups involved in search, containment/diversion, repair, traffic control, public control or evacuation, and restoration.
The Company's overall Emergency Notification Chart (Figure 2.2) indicates individuals within the Company and governmental agencies who must be contacted in the event of an emergency. Notification information for the Qualified Individuals, Alternate Qualified Individuals, emergency response contractors, and governmental agencies is located in Section 2.0 and the Response Zone Annexes.
Lines of communication between the Incident Commander, local personnel, and contractors are demonstrated in the organization charts provided in Figures 4.1 and 4.2. Communication of the overall spill response operation between the Company and the responsible government agencies will occur between the Incident Commander and the Federal On-Scene Coordinator.
Central Communications System
Prearranged communication channels are of the utmost importance in dealing with Company emergencies. The notification procedures and telephone contacts documented in Section 2.0 will be reviewed in accordance with the earlier documented updating procedures. The predetermined communications channels include the following:

- A list of emergency telephone numbers for internal management and emergency response personnel (Figures 2.2 and 2.5).
- A list of emergency telephone numbers for various external resources such as the Fire Departments, Public Officials and local agencies is provided in the Annexes.
- A list of emergency telephone numbers for contract response resources (Figure 2.5).

Communications Equipment
Field communications during a spill response will be handled via radios, telephones, cellular phones, fax machines, and computers, which will be maintained by Company personnel. In the event of a Worst

Case Discharge, field communications will be enhanced with contract resources as the situation demands.

Communications Type
Voice communications may be conducted over the public telephone system or Company provided two-way radio equipment.
Radios - Hand-held and vehicle-mounted radio sets are the most effective means of communication for the field response operation. The units are battery operated, multi-channeled, and have a typical range that will cover the area of the response operation. Additional radio sets and battery packs/charges will be necessary in the event of a prolonged response operation.
Telephone (Conventional) - Conventional land line telephones are the most effective means of communication for regulatory and advisory notifications during a spill response operation. Additional telephone lines can be installed in the event of a prolonged response operation. All major facilities have access to standard telephone service.
Cellular - Cellular telephones are useful during spill events giving the user the ability to travel while using the communication system.
Computers - Computers are commonly used in networks which allow access to various other locations and company personnel. Computers also speed the consolidation of information and preparation of a written report.

Figure A.1 Company Owned Spill Response Equipment

As noted above, the Company owns and operates oil spill response equipment contained within response trailers staged throughout the pipeline system. This figure includes attached equipment summaries detailing locations, type and amount of equipment stored in the response company owned response trailers.

- Canada – Company Owned Spill Response Equipment
- US – Company Owned Spill Response Equipment

When viewing this plan electronically, with access to the TC Energy Intranet, click the links above to view Company Owned Equipment Lists. When viewing this plan without access to the TC Energy Intranet, Equipment Lists can be located on the USB Drive accompanying the controlled plan.

In accordance with 40 CFR 262.261 (e) reference the local Keystone site specific emergency plans.

Figure A.2 Response Resources

Zone 1: Hardisty Tank Terminal

Cooperatives

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential vendor names and contact information.

Zone 2: Hardisty Pump Station to Regina Pump Station

Cooperatives

Zone 3: Regina Pump Station to Haskett Pump Station

Cooperatives

Zone 4: North Dakota, South Dakota, and Nebraska

OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MMPD	WCD1	WCD2	WCD3
----------	----------	River/Canal	X	X	X	X
----------	----------	Inland	X	X	X	X
----------	----------	Open Ocean			X	X
		Offshore			X	X
		Near Shore			X	X
		Great Lake				

Zone 5: Kansas, Missouri, Illinois

OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MMPD	WCD1	WCD2	WCD3
----------	----------	River/Canal	X	X	X	X
----------	----------	Inland	X	X	X	X
----------	----------	Open Ocean	X	X	X	X
		Offshore	X		X	X
		Near Shore	X		X	X
		Great Lake				

Zone 6: Cushing Extension

OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MMPD	WCD1	WCD2	WCD3
----------	----------	River/Canal	X	X	X	X
----------	----------	Inland	X		X	X
----------	----------	Open Ocean			X	X
		Offshore			X	X
		Near Shore			X	X
		Great Lake				

Zone 7: Cushing Tank Terminal

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential vendor names and contact information.

OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MMPD	WCD1	WCD2	WCD3
----------	----------	River/Canal	X	X	X	X
----------	----------	Inland	X	X	X	X
----------	----------	Open Ocean			X	X
		Offshore			X	X
		Near Shore			X	X
		Great Lake				

Zone 8: Gulf Coast

OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MMPD	WCD1	WCD2	WCD3
----------	----------	River/Canal	X	X	X	X
----------	----------	Inland	X	X	X	X
----------	----------	Open Ocean			X	X
		Offshore	X	X	X	X
		Near Shore	X	X	X	X
		Great Lake				

Zone 9: Houston Tank Terminal

OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MMPD	WCD1	WCD2	WCD3
----------	----------	River/Canal	X	X	X	X
----------	----------	Inland	X	X	X	X
----------	----------	Open Ocean			X	X
		Offshore	X	X	X	X
		Near Shore	X	X	X	X
		Great Lake				

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential vendor names and contact information.

Figure A.3 USCG OSRO Classification

The USCG has classified OSROs according to their response capabilities, within each Captain of the Port (COTP) zone, for vessels and for facilities in four types of environments. Response capabilities are rated MMPD, WCD1, WCD2, or WCD3 as described below:

MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATIONS			
Classification	**Resource Quantity Guidelines**	**Maximum Facility Response Times**	**Maximum Vessel Response Times**
Rivers/Canals			
MMPD	Protective Boom: 4,000*ft EDRC: 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours

WCD1	Protective Boom: EDRC: TSC:	25,000*ft 1,875 bbls 3,750 bbls	High Volume Ports: Other Ports:	6 hours 12 hours	High Volume Ports: Other Ports:	12 hours 24 hours
WCD2	Protective Boom: EDRC: TSC:	25,000*ft 3,750 bbls 7,500 bbls	High Volume Ports: Other Ports:	30 hours 36 hours	High Volume Ports: Other Ports:	36 hours 48 hours
WCD3	Protective Boom: EDRC: TSC:	25,000*ft 7,500 bbls 15,000 bbls	High Volume Ports: Other Ports:	54 hours 60 hours	High Volume Ports: Other Ports:	60 hours 72 hours
Great Lakes						
MMPD	Protective Boom: EDRC: TSC:	6,000*ft 1,200 bbls 2,400 bbls	All Ports:	6 hours	All Ports:	12 hours
WCD1	Protective Boom: EDRC: TSC:	30,000*ft 6,250 bbls 12,500 bbls	All Ports:	12 hours	All Ports:	18 hours
WCD2	Protective Boom: EDRC: TSC:	30,000*ft 12,500 bbls 25,000 bbls	All Ports:	36 hours	All Ports:	42 hours
WCD3	Protective Boom: EDRC: TSC:	30,000*ft 25,000 bbls 50,000 bbls	All Ports:	60 hours	All Ports:	66 hours

MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATIONS			
Classification	**Resource Quantity Guidelines**	**Maximum Facility Response Times**	**Maximum Vessel Response Times**
Inland			
MMPD	Protective Boom: 6,000*ft EDRC: 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD1	Protective Boom: 30,000*ft EDRC: 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD2	Protective Boom: 30,000*ft EDRC: 25,000 bbls TSC: 50,000 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
WCD3	Protective Boom: 30,000*ft EDRC: 50,000 bbls TSC: 100,000 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours
Near Shore			
MMPD	Protective Boom: 8,000*ft EDRC: 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD1	Protective Boom: 30,000*ft EDRC: 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD2	Protective Boom: 30,000*ft EDRC: 25,000 bbls TSC: 50,000 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
WCD3	Protective Boom: 30,000*ft EDRC: 50,000 bbls TSC: 100,000 bbls	High Volume Ports: 54 hours Other Ports: 60 hours (for open ocean, plus travel time from shore)	High Volume Ports: 60 hours Other Ports: 72 hours (for open ocean, plus travel time from shore)

MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATIONS			
Classification	**Resource Quantity Guidelines**	**Maximum Facility Response Times**	**Maximum Vessel Response Times**
Offshore			
MMPD	Protective Boom: 8,000*ft EDRC: 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD1	Protective Boom: 15,000*ft EDRC: 12,500 bbls TSC: 25,000 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD2	Protective Boom: 15,000*ft EDRC: 25,000 bbls TSC: 50,000 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
WCD3	Protective Boom: 15,000*ft EDRC: 50,000 bbls TSC: 100,000 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours
Open Ocean			
MMPD	Protective Boom: 0*ft EDRC: 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD1	Protective Boom: 0*ft EDRC: 12,500 bbls TSC: 25,000 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
WCD2	Protective Boom: 0*ft EDRC: 25,000 bbls TSC: 50,000 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
WCD3	Protective Boom: 0*ft EDRC: 50,000 bbls TSC: 100,000 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours

1. Rivers/canals include bodies of water, including the Intracoastal Waterway and other bodies artificially created for navigation, confined within an inland area and having a project depth of 12 feet (3.66 meters).

2. EDRC stands for "effective daily recovery capacity," or the calculated recovery capacity of oil recovery devices determined by using a formula that takes into account limiting factors such as daylight, weather, sea state, and emulsified oil in the recovered material.
3. TSC stands for "temporary storage capacity," meaning sufficient storage capacity equal to twice the EDRC of an OSRO. Temporary storage may include inflatable bladders, rubber barges, certified barge capacity, or other temporary storage that can be utilized on scene at a spill response and which is designed and intended for the storage of flammable or combustible liquids. It does not include vessels or barges of opportunity for which no pre-arrangements have been made. Fixed shore-based storage capacity, ensured available by contract or other means, will be acceptable.

   * In addition, 1,000 feet of containment boom plus 300 feet per skimming system.

Figure A.4 US OSRO Contract/Canadian Contractor & Cooperative Agreements

As noted above, the Company maintains a contract with an Oil Spill Removal Organization for the US side of the border pursuant to 49 CFR § 194.115 to respond to all discharges along the US section of the pipeline within the respective response zones.
US contracted OSRO:

- ----------

Clean-up contractors and Oil Spill Cooperative Agreements have been identified on the Canadian side of the border to respond to discharges along the Canadian section of the Pipeline within the respective response zones.
Canadian contractors and Cooperative Agreements:

- ----------
- ----------
- ----------
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- ----------
- ----------
- ----------
- ----------

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential vendor names and contact information.

When viewing this plan electronically, with access to the TC Energy Intranet, click the links above to view contract certifications and letters of coverage. When viewing this plan without access to the TC Energy Intranet, contract certifications and letters of coverage can be located on the USB Drive accompanying the controlled plan.

APPENDIX B Worst Case Discharge Analysis and Scenarios

Introduction

This Appendix identifies potential causes for oil discharges and discusses the response efforts that are necessary for successful mitigation. Included in this Appendix are hypothetical scenarios for various types of spills that have the potential to occur along the system. It is anticipated that the Company will respond to spills in a consistent manner regardless of the location. Therefore, the guidelines discussed in this appendix will apply to all spills whenever possible.

United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Discharge Volume Calculation

- Worst Case Discharge

  The largest volume (Bbls) of the following:
  - Pipeline's maximum release time (hrs), plus the maximum shutdown response time (hrs), multiplied by the maximum flow rate (bph), plus the largest line drainage volume after shutdown of the line section.
    --OR--
  - Largest foreseeable discharge for the line section is based on the maximum historic discharge, if one exists, adjusted for any subsequent corrective action or preventive action taken.
    --OR--
  - Capacity of the single largest breakout tank or battery of tanks within a single secondary containment system, adjusted for the capacity or size of the secondary containment system.

The Worst Case Discharge calculation for all pipeline (non-breakout tank) response zones is calculated using relevant pipeline and product properties as well as as-built elevation profile data within a specialized software developed by Dynamic Risk Assessment Systems, Inc, further explained later in this Appendix. In accordance with an email received from the US Department of Transportation – Pipeline and Hazardous Materials Safety Administration (DOT-PHMSA), “use of discharge modeling is an accepted means to determine the worst case discharge (WCD) from a pipeline. The methodology described in TC Energy’s Keystone Pipeline ERP states that modeling is used and a description and name of the model is provided […] This is acceptable.”

- Click here to access the above mentioned email from DOT-PHMSA; when accessing when viewing this plan without access to the TC Energy Intranet, these forms can be located on the USB Drive accompanying the controlled plan.

Scenario Types

The occurrence of a Worst Case Discharge (WCD) could be the result of any number of scenarios along the pipeline system including:

- Piping rupture.

- Piping leak, under pressure and not under pressure.
- Explosion or fire.
- Equipment failure (e.g. pumping system failure, relief valve failure, or other general equipment relevant to operational activities associated with internal or external facility transfers).

The response actions to each of these scenarios are outlined in Section 3.1 and Figure 3.1. The response resources are identified in a quick reference format in Figure 2.5. Pipeline response personnel list/telephone numbers and other internal/external resources telephone numbers are detailed in Figures 2.2 and 2.5.

Hardisty Tank Terminal - Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls
A worst case discharge for the Hardisty Terminal is a discharge that does not exceed barrels.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	barrels (Hardisty Tank Terminal Response Zone includes zero (0) miles of pipe. All piping related to and near this facility is included in the Hardisty Pump Station to Regina Pump Station Response Zone.)
Breakout Tank Worst Case Discharge	barrels
Historic Discharge	

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = Bbls

Description

This size discharge would most likely occur due to a natural disaster or catastrophic event. Examples may include, but not limited to: a) Tank Fire, b) Catastrophic tank shell failure. The type of material that could be discharged is Crude Oil.

Volume

The worst case discharge scenario involving breakout tankage uses the single largest volume tank in the response zone, adjusted for the size of the secondary containment system. Applicable adjustment(s) for the largest tank include:

Spill Prevention Measures	Percent Reduction Allowed
Built Repaired to API standards	10%
Overfill protection standards	5%
Testing/cathodic protection	5%
Secondary containment capacity greater than 100% capacity of tank and designed according to NFPA 30	50%

The maximum level of the largest tank allows for a maximum fill volume of barrels. Thus, a 70 % reduction yields a Worst Case Discharge amount of Bbls.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Planning Volume Calculations

Location Data	
Location Type	Rivers/Canals
Port Type	Non-High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%

Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity (bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	60

Hardisty Pump Station/Regina Pump Station – Response Zone Capability Scenarios

Worst Case Discharge

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

PHMSA Worst Case Discharge = Bbls
A worst case discharge for the Hardisty Pump Station/ Regina Pump Station is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = Bbls
Description The pipeline-based Worst Case Discharge is projected as a scenario 18,768.506 meters downstream of valve BELPL+06_4-A0-MLV-001 (MLV 15-1). Volume The Worst Case Discharge for this response zone was calculated using relevant pipeline and product properties as well as accurate as-built elevation profile data. The outflow is modeled as a full bore rupture located on the bottom side of the pipe which is equal in size to that of the internal diameter of the pipeline. The Worst Case Discharge Volume calculation is divided into four distinct phases: • Phase 1 - Full Operation • Phase 2 - Pump Shutdown • Phase 3 - Valve Closure • Phase 4 - Gravity Drainage The Full Operation Phase accounts for the time required for the controllers to detect the leak, react and initiate shutdown procedures. During this phase, the system is under full operating conditions, and for conservatism it is assumed that this phase will last 10 minutes, before pump shutdown initiates. The discharge volume for this phase is calculated by multiplying the flow rate of the system by the duration of time before shutdown is initiated (10 minutes). Once this phase is complete, the Pump Shutdown Phase begins, which initiates the flow rate and pressure drop across the line. Pump shutdown is modeled as a decrease from 100% flow rate and pressure to 0% flow rate and pressure in 9 minutes. During this isolation phase, the valves travel from fully open to fully closed. The gravity driven flow of product past the valves is progressively constrained as the valves incrementally close. The valves were modeled on an individual basis to reflect their individual valve closure profiles. Finally, once the valves are closed, the isolated section continues to drain, subject to the formation of vacuum locks at local elevation profile inflections that prevent further flow past these locations. While accounting for these locations where vacuum lock occurs, it is assumed that everything else that can possibly drain will drain.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	

Breakout Tank Worst Case Discharge	0 barrels (This Response Zone includes zero (0) breakout tanks)
Historic Discharge	

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = 0 Bbls
Volume There are no breakout tanks in the Response Zone, therefore there is no volume calculations.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	Non-High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%

Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity (bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	60

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Regina Pump Station/Haskett Pump Station – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls
A worst case discharge for the Regina Pump Station / Haskett Pump Station is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = Bbls
Description The pipeline-based Worst Case Discharge is projected as a scenario 4.98 meters upstream of valve MOSMI+30_0-A0-MLV-001. Volume The Worst Case Discharge for this response zone was calculated using relevant pipeline and product properties as well as accurate as-built elevation profile data. The outflow is modeled as a full bore rupture located on the bottom side of the pipe which is equal in size to that of the internal diameter of the pipeline. The Worst Case Discharge Volume calculation is divided into four distinct phases: • Phase 1 - Full Operation • Phase 2 - Pump Shutdown • Phase 3 - Valve Closure • Phase 4 - Gravity Drainage The Full Operation Phase accounts for the time required for the controllers to detect the leak, react and initiate shutdown procedures. During this phase, the system is under full operating conditions, and for conservatism it is assumed that this phase will last 10 minutes, before pump shutdown initiates. The discharge volume for this phase is calculated by multiplying the flow rate of the system by the duration of time before shutdown is initiated (10 minutes). Once this phase is complete, the Pump Shutdown Phase begins, which initiates the flow rate and pressure drop across the line. Pump shutdown is modeled as a decrease from 100% flow rate and pressure to 0% flow rate and pressure in 9 minutes. During this isolation phase, the valves travel from fully open to fully closed. The gravity driven flow of product past the valves is progressively constrained as the valves incrementally close. The valves were modeled on an individual basis to reflect their individual valve closure profiles. Finally, once the valves are closed, the isolated section continues to drain, subject to the formation of vacuum locks at local elevation profile inflections that prevent further flow past these locations. While accounting for these locations where vacuum lock occurs, it is assumed that everything else that can possibly drain will drain.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Breakout Tank Worst Case Discharge	0 barrels (This Response Zone includes zero (0) breakout tanks)
Historic Discharge	

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = 0 Bbls
Volume There are no breakout tanks in the Response Zone, therefore there is no volume calculations.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	Non-High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%

Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity (bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	60

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

North Dakota, South Dakota, Nebraska – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls

A worst case discharge for the North Dakota, South Dakota, Nebraska is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = Bbls

Description

This response zone is considered a non-High Volume Area. The pipeline-based Worst Case Discharge is projected as a scenario 20,897.055 feet downstream of valve LUDDE+23_8-A0.

Volume

The Worst Case Discharge for this response zone was calculated using relevant pipeline and product properties as well as issued for construction profile data. The outflow is modeled as a full bore rupture which is equal in size to that of the internal diameter of the pipeline. The Worst Case Discharge Volume calculation is divided into four distinct phases:

- Phase 1 - Full Operation
- Phase 2 - Pump Shutdown
- Phase 3 - Valve Closure
- Phase 4 - Gravity Drainage

The Full Operation Phase accounts for the time required for the controllers to detect the leak, react and initiate shutdown procedures. During this phase, the system is under full operating conditions, and for conservatism it is assumed that this phase will last 10 minutes, before pump shutdown initiates. The discharge volume for this phase is calculated by multiplying the flow rate of the system by the duration of time before shutdown is initiated (10 minutes). The flow rate that was used for the full operation phase is 679,300 bbls per day (4750 m3/hr), with a pipeline diameter of 30 inches.

Once this phase is complete, the Pump Shutdown Phase begins, which initiates the flow rate and pressure drop across the line. Pump shutdown is a decrease from 100% flow rate and pressure to 0% flow rate and pressure through the course of 9 minutes. For this calculation, flow rate is calculated at 100% for the full 9 minutes as per PHMSA regulations.

During this isolation phase, the valves travel from fully open to fully closed. During this phase, the drain down volumes are dependent on the elevation profile across the entire pump section. The gravity driven flow of product past the valves is progressively constrained as the valves incrementally close. A valve closure time of 6 minutes was used.

Finally, once the valves are closed, the isolated section continues to drain, subject to the formation of vacuum locks at local elevation profile inflections that prevent further flow past these locations. During this phase, the drain down volumes are solely dependent on the elevation of the valve section which the rupture is being modeled with the use of specialized software developed by Dynamic Risk

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Assessment Systems, Inc. While accounting for these locations where vacuum lock occurs, it is assumed that everything else that can possibly drain will drain.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	
Breakout Tank Worst Case Discharge	0 barrels (This Response Zone includes zero (0) breakout tanks)
Historic Discharge	

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = 0 Bbls
Volume There are no breakout tanks in the Response Zone, therefore there is no volume calculations.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	Non-High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity(bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	60

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Kansas, Missouri, Illinois – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls

A worst case discharge for the Kansas, Missouri, Illinois is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = Bbls

Description

This response zone is considered a High Volume Area because it crosses the Missouri River at St. Joseph, Missouri. The pipeline-based Worst Case Discharge is projected as a scenario 93,205 feet downstream from Centralia Pump Station.

Volume

The Worst Case Discharge for this response zone was calculated using relevant pipeline and product properties as well as issued for construction profile data. The outflow is modeled as a full bore rupture which is equal in size to that of the internal diameter of the pipeline. The Worst Case Discharge Volume calculation is divided into four distinct phases:

- Phase 1 - Full Operation
- Phase 2 - Pump Shutdown
- Phase 3 - Valve Closure
- Phase 4 - Gravity Drainage

The Full Operation Phase accounts for the time required for the controllers to detect the leak, react and initiate shutdown procedures. During this phase, the system is under full operating conditions, and for conservatism it is assumed that this phase will last 10 minutes, before pump shutdown initiates. The discharge volume for this phase is calculated by multiplying the flow rate of the system by the duration of time before shutdown is initiated (10 minutes). The flow rate that was used for the full operation phase is 679,300 bbls per day (4750 m3/hr), with a pipeline diameter of 30 inches.

Once this phase is complete, the Pump Shutdown Phase begins, which initiates the flow rate and pressure drop across the line. Pump shutdown is a decrease from 100% flow rate and pressure to 0% flow rate and pressure through the course of 9 minutes. For this calculation, flow rate is calculated at 100% for the full 9 minutes as per PHMSA regulations.

During this isolation phase, the valves travel from fully open to fully closed. During this phase, the drain down volumes are dependent on the elevation profile across the entire pump section. The gravity driven flow of product past the valves is progressively constrained as the valves incrementally close. A valve closure time of 4 minutes was used.

Finally, once the valves are closed, the isolated section continues to drain, subject to the formation of vacuum locks at local elevation profile inflections that prevent further flow past these locations. During this phase, the drain down volumes are solely dependent on the elevation of the valve section which the rupture is being modeled with the use of specialized software developed by Dynamic Risk

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Assessment Systems, Inc. While accounting for these locations where vacuum lock occurs, it is assumed that everything else that can possibly drain will drain.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	
Breakout Tank Worst Case Discharge	0 barrels (This Response Zone includes zero (0) breakout tanks)
Historic Discharge	

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = 0 Bbls
Volume There are no breakout tanks in the Response Zone, therefore there is no volume calculations.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity (bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	54

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Cushing Extension – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls

A worst case discharge for the Cushing Extension is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = Bbls

Description

This response zone is considered a High Volume Area because it crosses the Smokey Hill River at the Abilene, Kansas. The pipeline-based Worst Case Discharge is projected as a scenario 1,283,000 (242.99 miles) feet downstream of Station Steele City.

Volume

The Worst Case Discharge for this response zone was calculated using relevant pipeline and product properties as well as issued for construction profile data. The outflow is modeled as a full bore rupture which is equal in size to that of the internal diameter of the pipeline. The Worst Case Discharge Volume calculation is divided into four distinct phases:

- Phase 1 - Full Operation
- Phase 2 - Pump Shutdown
- Phase 3 - Valve Closure
- Phase 4 - Gravity Drainage

The Full Operation Phase accounts for the time required for the controllers to detect the leak, react and initiate shutdown procedures. During this phase, the system is under full operating conditions, and for conservatism it is assumed that this phase will last 10 minutes, before pump shutdown initiates. The discharge volume for this phase is calculated by multiplying the flow rate of the system by the duration of time before shutdown is initiated (10 minutes). The flow rate that was used for the full operation phase is 679,300 bbls per day (4750 m3/hr), with a pipeline diameter of 36 inches.

Once this phase is complete, the Pump Shutdown Phase begins, which initiates the flow rate and pressure drop across the line. Pump shutdown is a decrease from 100% flow rate and pressure to 0% flow rate and pressure through the course of 9 minutes. For this calculation, flow rate is calculated at 100% for the full 9 minutes as per PHMSA regulations.

During this isolation phase, the valves travel from fully open to fully closed. During this phase, the drain down volumes are dependent on the elevation profile across the entire pump section. The gravity driven flow of product past the valves is progressively constrained as the valves incrementally close. A valve closure time of 4 hours (manual) was used.

Finally, once the valves are closed, the isolated section continues to drain, subject to the formation of vacuum locks at local elevation profile inflections that prevent further flow past these locations. During this phase, the drain down volumes are solely dependent on the elevation of the valve section which the rupture is being modeled with the use of specialized software developed by Dynamic Risk

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Assessment Systems, Inc. While accounting for these locations where vacuum lock occurs, it is assumed that everything else that can possibly drain will drain.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	
Breakout Tank Worst Case Discharge	0 barrels (This Response Zone includes zero (0) breakout tanks)
Historic Discharge	

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = 0 Bbls
Volume There are no breakout tanks in the Response Zone, therefore there is no volume calculations.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity(bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	54

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Cushing Tank Terminal – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls
A worst case discharge for the Cushing Extension is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = 0 Bbls
Description The pipeline-based Worst Case Discharge is 0 as the Cushing Tank Terminal Response Zone includes 0 miles of pipe. All piping related to and near this facility is included in the Cushing Extension Response Zone.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	0 barrels (Cushing Tank Terminal Response Zone includes zero (0) miles of pipe. All piping related to and near this facility is included in either Response Zone 6 or 8.)
Breakout Tank Worst Case Discharge	
Historic Discharge	There have been no historic releases from this Response Zone.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = Bbls

Description
This size discharge would most likely occur due to a natural disaster or catastrophic event. Examples may include, but not limited to: a) Tank Fire, b) Catastrophic tank shell failure. The type of material that could be discharged is Crude Oil.

Volume
The worst case discharge scenario involving breakout tankage uses the single largest volume tank in the response zone, adjusted for the size of the secondary containment system. Applicable adjustment(s) for the largest tank include:

Spill Prevention Measures	Percent Reduction Allowed
Built Repaired to API standards	10%
Overfill protection standards	5%
Testing/cathodic protection	5%
Secondary containment capacity greater than 100% capacity of tank and designed according to NFPA 30	50%

The maximum level of the largest tank allows for a maximum fill volume of barrels. Thus, a 70 % reduction yields a Worst Case Discharge amount of Bbls.

A catastrophic discharge can originate from a line section. However, the maximum amount does not exceed the amount that could be released from the largest storage tank.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Planning Volume Calculations

Location Data	
Location Type	Rivers/Canals
Port Type	High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%

Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity (bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	54

Gulf Coast – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls
A worst case discharge for the Gulf Coast is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = Bbls
Description This response zone is considered a High Volume Area because it crosses the Red River near Bonham, Texas. The pipeline-based Worst Case Discharge is projected as a scenario 194,389.76 ft. downstream from Corrigan Pump Station. Volume The Worst Case Discharge for this response zone was calculated using relevant pipeline and product properties as well as issued for construction profile data. The outflow is modeled as a full bore rupture which is equal in size to that of the internal diameter of the pipeline. The Worst Case Discharge Volume calculation is divided into four distinct phases: • Phase 1 - Full Operation • Phase 2 - Pump Shutdown • Phase 3 - Valve Closure • Phase 4 - Gravity Drainage The Full Operation Phase accounts for the time required for the controllers to detect the leak, react and initiate shutdown procedures. During this phase, the system is under full operating conditions, and for conservatism it is assumed that this phase will last 10 minutes, before pump shutdown initiates. The discharge volume for this phase is calculated by multiplying the flow rate of the system by the duration of time before shutdown is initiated (10 minutes). The flow rate that was used for the full operation phase is 920,000 bbls per day, with a pipeline diameter of 36 inches. Once this phase is complete, the Pump Shutdown Phase begins, which initiates the flow rate and pressure drop across the line. Pump shutdown is a decrease from 100% flow rate and pressure to 0% flow rate and pressure through the course of 9 minutes. For this calculation, flow rate is calculated at 100% for the full 9 minutes as per PHMSA regulations. During this isolation phase, the valves travel from fully open to fully closed. During this phase, the drain down volumes are dependent on the elevation profile across the entire pump section. The gravity driven flow of product past the valves is progressively constrained as the valves incrementally close. A valve closure time of 4.6 minutes was used. Finally, once the valves are closed, the isolated section continues to drain, subject to the formation of vacuum locks at local elevation profile inflections that prevent further flow past these locations. During this phase, the drain down volumes are solely dependent on the elevation of the valve section which the rupture is being modeled with the use of specialized software developed by Dynamic Risk

Assessment Systems, Inc. While accounting for these locations where vacuum lock occurs, it is assumed that everything else that can possibly drain will drain.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	
Breakout Tank Worst Case Discharge	0 barrels (This Response Zone includes zero (0) breakout tanks)
Historic Discharge	

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = 0 Bbls
Volume There are no breakout tanks in the Response Zone, therefore there is no volume calculations.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity(bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Houston Tank Terminal – Response Zone Capability Scenarios

Worst Case Discharge

PHMSA Worst Case Discharge = Bbls
A worst case discharge for the Gulf Coast is a discharge that does not exceed barrels.

Pipeline Worst Case Discharge = 0 Bbls
Description The pipeline-based Worst Case Discharge is 0 as the Houston Tank Terminal Response Zone includes 0 miles of pipe. All piping related to and near this facility is included in the Gulf Coast Extension Response Zone.

Comparison of the Three Volumes of Worst Case Discharge Source	
Pipeline Worst Case Discharge	0 barrels (Houston Tank Terminal Response Zone includes zero (0) miles of pipe. All piping related to and near this facility is included in Response Zone 8.)
Breakout Tank Worst Case Discharge	
Historic Discharge	There have been no historic released from this Response Zone.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Requirement
The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for Non-High Volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

NOTE:

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

Breakout Tank Worst Case Discharge = Bbls
Description This size discharge would most likely occur due to a natural disaster or catastrophic event. Examples

may include, but not limited to: a) Tank Fire, b) Catastrophic tank shell failure. The type of material that could be discharged is Crude Oil.

Volume
The worst case discharge scenario involving breakout tankage uses the single largest volume tank in the response zone, adjusted for the size of the secondary containment system. Applicable adjustment(s) for the largest tank include:

Spill Prevention Measures	Percent Reduction Allowed
Built Repaired to API standards	10%
Overfill protection standards	5%
Testing/cathodic protection	5%
Secondary containment capacity greater than 100%, and designed in accordance with NFPA 30	50%

The maximum level of the largest tank allows for a maximum fill volume of barrels. Thus, a 70 % reduction yields a Worst Case Discharge amount of Bbls.

A catastrophic discharge can originate from a line section. However, the maximum amount does not exceed the amount that could be released from the largest storage tank.

Planning Volume Calculations

Location Data	
Location Type	Inland/Near Shore
Port Type	High Volume
WCD Product Type	Crude Oil
Product Group	3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)	

Discharge Volumes/Calculations	
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)	

Selected Calculation Factors (Based on USCG Tables)	
Removal Capacity Planning Volume - Percent Natural Dissipation	30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil	50%
Removal Capacity Planning Volume - Percent Oil Onshore	50%
Emulsification Factor	2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor	15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor	25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor	40%

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			
Shoreline Recovery Volume (bbls)			
Shoreline Cleanup Volume (bbls)			
	Tier 1	Tier 2	Tier 3
On-Water Recovery Capacity (bbls/day)			
Shallow Water Resp Capacity (bbls/day)			
Storage Capacity (bbls/day)			
On-Water Response Capacity (bbls/day)			
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	54

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes worst case discharge volumes.

APPENDIX C Emergency Pre-Planning

Emergency Pre-Planning

Leak detection and discharge prevention is accomplished through safe operating procedures and maintenance procedures outlined in the Company Operations and Maintenance (O&M) Manual. The Company Operations and Maintenance Manual is designed to meet the requirements found in Statutory Orders and Regulations/99-294 S27, Canada Energy Regulator, Operation and Maintenance Manuals, and Title 49, US Code of Federal Regulations, Part 195, Transportation of Hazardous Liquids by Pipeline.

C-1 Release Detection

The Keystone Liquids Pipelines Control Center and Company Field Employees are responsible for ensuring the integrity of facilities and detecting releases.

There are four primary types of indications that a release may be occurring:

- An unexplained hydraulic upset condition observed in the Pipeline system operating data.
- A consistent unexplainable Pipeline system shortage occurring over several check time periods.
- An alarm from a Supervisory Control and Data Acquisition-based leak detection system.
- A report of a direct observation of a release or released product received from an employee or the public.

All indications, including supposedly direct observation, are subject to confirmation; however, the Company policy is to shutdown if any doubt exists as to the integrity of the Pipeline system. The simultaneous occurrence of two or more of the indicators above greatly increases the probability that the Pipeline system has lost integrity.

Specific guidance for response to abnormal operating conditions and determining the location of a suspected pipeline release may be found in the Company's Operations and Maintenance Manual, maintained separately.

A form for recording conversations with an observer who reports an emergency is located in Appendix F of this Plan. Copies of this form should be kept readily accessible at telephones.

Routine actions to be taken by Company Field Employees to ensure facility integrity and detect releases are listed as follows:

- LPCC Monitors Pressures using Supervisory Control and Data Acquisition
- Routine Station/ROW Checks Performed
- Routine Aerial Surveillance
- 24 Hour Emergency Reporting Phone Number Monitored

C-2 Leak Detection System

Leak detection systems utilized along the Pipeline include:

- System-level indication is accomplished through usage of a Supervisory Control and Data Acquisition (SCADA) system. This system is capable of monitoring flow rates, pressure, metering information (delivery / receipt volumes), temperature, and valve positions. The Supervisory Control and Data Acquisition system is monitored on a 24-hour per day basis by both the centralized Pipeline Control Center and Secondary Control points.

The location of a spill caused by a catastrophic break, which may be indicative of a Worst Case Discharge, can be inferred by Liquids Pipelines Control Center personnel down to a Pipeline section between operating pump stations. This inference is based upon rapid and abrupt changes in operating conditions.

C-3 Discharge Prevention System

Pipeline pump stations are designed in a manner that maximizes the containment of leaks on-site and deters the migration of leaks off-site. Discharge prevention is accomplished through the following measures:

- Pipelines and related structures have grounding systems to reduce the possibility of accidental ignition due to lightning.
- Discharge prevention is also accomplished through the use of general housekeeping procedures and leak inspection system.

APPENDIX D Training and Drills

D-1 Response Team Training

The Company provides training related to discharge prevention, testing and response, including measures to repair Pipeline ruptures and mitigate discharges. The training methods address oil discharges from the Pipeline from several perspectives: human health and safety, rupture control and repair operations, pollution control, and overall (crisis) management of the emergency.

The competency of each training program is closely monitored by the Training Section through observation of and/or participation in actual training sessions.

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

That all personnel know:

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

That all reporting personnel know:

- The Pipelines and Response Zone details for the affected area (Response Zones Annexes).
- The telephone number of the Federal Provincial/State and local agencies and other required notifications (Section 2.0).
- The notification process. (Section 2.0).

That all response personnel know:

- The characteristics and hazards of the oil discharged (Section 3.0 and Appendix G - SDS).
- The conditions that is likely to worsen emergencies, including the consequences of pipeline malfunctions, and the appropriate corrective actions.
- The steps necessary to control any accidental discharge of oil and to minimize the potential for fire, explosion, toxicity or environmental damage (Section 3.0).
- The proper firefighting procedures and use of equipment, fire suits, and breathing apparatus (Section 3.0). Only trained persons will be utilized. Company personnel are only trained on the use of handheld Ansul 30# fire extinguisher units for small incipient fires.

Emergency Response Plan Review
All Response Team Members should review their Emergency Response Plan whenever their job position or responsibilities change under the Plan. A copy of this Plan will always be available to Team Members.

Liquids Pipelines Control Center Training and Procedures
Training and certification ensures Controllers recognize all manners of pipeline operation, including start-up and shutdown, steady state and transient operations and leak detection operations. Controllers

are not permitted to operate the system on their own until they have successfully achieved the necessary competency and have been appropriately qualified. Regular re-training and re-qualification ensures skills and awareness of procedures are maintained;

Training takes place on a state-of-the-art simulator that fully represents the pipeline and includes a fully integrated leak detection system; enabling training on real world scenarios, including simulated leaks. Any significant changes to the actual pipeline system are first implemented in the simulator and Controllers are fully trained on the change prior to pipeline system implementation;

A dedicated leak detection controller with the responsibility for monitoring the leak detection system and making decisions regarding response to leak indications. Two other controllers are in the control room at all times; one dedicated to pipeline operation and one dedicated to terminal and delivery facility operation. Controllers are adjacent to one another and are in constant communication. Team training and a team culture within the control room ensures a collaborative response to anomalous events.

The line is to be immediately shutdown when an anomaly suggesting a leak event that cannot be definitively evaluated and explained as a non-leak event within 10 minutes;

Controllers are empowered to shutdown the pipeline at their discretion. All non-routine alerts or concerns are investigated immediately by pipeline controllers and field staff. Line start up after an anomaly is identified cannot occur until the anomaly is explained, and re-start is approved by both the LPCC Manager and the Regional On-Call Manager.

Hazardous Waste Operations and Emergency Response (29 CFR 1910.120)
Federal and State regulations require that Response Team Members maintain up-to-date Hazardous Waste Operations and Emergency Response training necessary to function in their assigned positions. At a minimum, team members will receive "First Responder Awareness Level" training. All personnel responding to an incident must satisfy the applicable Hazardous Waste Operations and Emergency Response training requirements of 29 CFR 1910.120.

Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response Training Requirements		
Responder Classification	**Required Training Hours**	**Refresher**
29CFR 1910.120(q) Emergency Response		
First Responder - Awareness Level	2-4 hrs demonstration of competency	same
First Responder - Operations Level	8 hrs	8 hrs
Hazardous Materials Technician	24 hrs plus competency	8 hrs
Hazardous Materials Specialist	24 hrs plus competency in specialized areas	8 hrs
Incident Commander	24 hrs plus competency	8 hrs
29CFR 1910.120(e) Clean Up Sites		
General Site Workers	40 hrs / 3 days on the job training	8 hrs
Occasional Workers (Limited Tasks)	24 hrs / 1 day on the job training	8 hrs
General Site Workers (Low Hazard)	24 hrs / 1 day on the job training	8 hrs
Supervisors	8 hrs supervisor training	8 hrs

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

Incident Command System
Response Team Members will receive Incident Command System training and may also receive supplemental training in other related general topics.

Training Records Maintenance
Emergency response training records are maintained at the Company's office. Training records for response personnel will be maintained for as long as personnel have duties in this Emergency Response Plan.

Contractor Training
The Company also recognizes that contract personnel must also have sufficient training to respond to emergency response situations. The Company communicates this training need to its key contractors during contract negotiations and often specifically spells out this requirement in its contracts. The Company also tends to use well-known spill response contractors whose reputation and experience levels help ensure personnel who respond will be trained to appropriate levels.

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

D-2 Response Team Exercises

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

Triennial Cycle		
Total Number	**Frequency**	**Exercise Type/Description**
12	Quarterly	Qualified Individual Notification Exercise (US)
3	Annually	Equipment Deployment Exercise (Facility-owned equipment)
3	Annual	Response Team Tabletop Exercise
3	Annual	Equipment Deployment Exercise (facilities with Oil Spill Removal Organization-owned equipment)

3	3 per Triennial Cycle	Unannounced Exercise (not a separate exercise) Actual response can be considered as an unannounced exercise. Credit can also be given for unannounced equipment deployment and Response Team tabletop exercises.

! **NOTE:** All Emergency Response Plan components must be exercised at least once in the Cycle.

Quarterly QI Notification Exercise
Scope: Exercise communication between Pipeline personnel and the Qualified Individual(s) and/or designated alternate(s). At least once each year, one of the notification exercises should be conducted during non-business hours.

Objective: Contact must be made with a Qualified Individual or designated alternate, as identified in the Plan.

General: All personnel receiving notification shall respond to the notification and verify their receipt of the notification. Personnel who do not respond should be contacted to determine whether or not they received the notification.

Annual Equipment Deployment Exercises (for operator and/or Oil Spill Removal Organization equipment)
Scope: Demonstrate ability to deploy spill response equipment identified in the Emergency Response Plan.

- May consist entirely of operator owned equipment, or a combination of OSRO and operator equipment.
- The number of equipment deployment exercises conducted should be such that equipment and personnel assigned to each Response Zone are exercised at least one a year. If the same personnel and equipment respond to multiple zones, they need only exercise once per year. If different personnel and equipment response to various Response Zones, each must participate in an annual equipment deployment exercise.

Objective: Demonstrate personnel's ability to organize and to deploy and operate response equipment. Ensure that the response equipment is in proper working order.

General: The Facility may take credit for actual equipment deployment to a spill, or for training sessions, as long as the activities are properly documented.

Annual Response Team Tabletop Exercise
Scope: Exercise the response team's organization, communication, and decision- making in managing a spill response. Each team identified within the Plan must conduct an annual Response Team Tabletop Exercise.

Objective: Exercise the response team in a review of the following:

- Knowledge of the Plan;

- Ability to organize team members to effectively interface with unified command;
- Communications capability; and
- Coordination for response capability as outlined in the response plan.

General: A minimum of one Response Team Tabletop Exercise in a triennial cycle will involve a Worst Case Discharge scenario.

Third Party Contractors Assessment Exercise for Oil Pipelines
Scope: Assess third party contractor's preparedness, availability, and capacity to respond to worst case discharge scenario.

Objectives: Third Party Contractors Assessment Exercises evaluate contractor's availability for response in 6, 12, and 72 hour time frames. Evaluation of response includes availability of both personnel and equipment responding to an emergency, as defined below:

- Personnel includes safety officers, supervisors, foremen, operators, and technicians.
- Equipment includes boats, boom, vacuum trucks, pumps, skimmers, waste storage, and heavy equipment.

Recommended Exercise Objectives for Third Party Contractors Assessment Exercise are listed below:

- Evaluate resources availability (via verbal commitment);
- Demonstrate the ability to request and confirm resources through communication with contractors;
- Demonstrate the ability for contractors to verbally communicate and confirm resource availability and estimated time of arrivals of internal resources and subcontractor network;
- Demonstrate contractors' ability to document all communications while maintaining accurate accountability of resource tracking; and
- Confirm the ability to effectively manage contractor's resource request process.

General: Third Party Contractors Assessment Exercises are repeated in the Canada and United States on an alternating annual basis. These exercises are held in Canada on odd-numbered years and in the United States on even-numbered years.

Government-Initiated Unannounced Exercise
Scope: Demonstrate ability to respond to a Worst Case Discharge spill event.

Objectives: Designated Emergency Response Team Members should demonstrate adequate knowledge of their Emergency Response Plan and the ability to organize, communicate, coordinate, and respond in accordance with that Plan.

General: Annually, the Pipeline and Hazardous Materials Safety Administration may conduct up to 20 unannounced exercises throughout the U.S. for the pipeline industry. A single owner or operator will not be required to participate in a PHMSA-initiated unannounced exercise if they have already participated in one within the previous 36 months.

Area Exercises
Objective: The purpose of the area exercise is to exercise the entire response community in a particular area. An area is defined as "that geographic area for which a separate and distinct Area Contingency Plan has been prepared, as described in Oil Pollution Act 90." The response community includes the Federal, State, and local government and industry. The area exercises are designed to exercise the government and industry interface for spill response.

General: The goal is to ensure that all areas of the country are exercised triennially. All area exercises will be developed by an exercise design team. The exercise design team is comprised of representatives from the Federal, State, and local government and industry. A lead plan holder would lead each area exercise. The lead plan holder is the organization (government or industry) that holds the primary plan that is exercised in the area exercise. The lead plan holder would have the final word on designing the scope and scenario of the exercise.

Exercise Documentation
All exercises should be documented and maintained virtually within EHSM and physically (as appropriate) at the Company office; documentation should specify:

- The type of exercise;
- Date and time of the exercise;
- A description of the exercise;
- The objectives met in the exercise;
- The components of the response plan exercised; and
- Lessons learned.

Exercise documentation should be kept on file for the required length of time depending on the regulating agency (three (3) years for the U.S. Coast Guard and five (5) years for the Pipeline and Hazardous Materials Safety Administration and the U.S. Environmental Protection Agency).

D-3 Purpose of Review and Evaluation

This Section provides procedures and information useful to responders for post incident/exercise review and evaluation. Post incident/exercise reviews should be conducted in a timely manner following an incident/exercise. The Plan should be evaluated to determine its usefulness during the incident/exercise and appropriate revisions should be made. All incident/exercise documentation should be included in the Plan evaluation process.

Outline of Review
Given below are items a team composed of outside people knowledgeable in spill response and key members of the response teams should examine. These questions are intended as guidelines only; many other questions are likely to be appropriate at each stage of a critique.

Detection

- Was the spill detected promptly?
- How was it detected? By whom?
- Could it have been detected earlier? How?

- Are any instruments or procedures available to consider which might aid in spill detection?

Notification

- Were proper procedures followed in notifying government agencies? Were notifications prompt?
- Was management notified promptly/response appropriate?
- Was the Pipeline owner/operator notified promptly? If so, why, how, and who? If not, why not?

Assessment/Evaluation

- Was the magnitude of the problem assessed correctly at the start?
- What means were used for this assessment?
- Are any guides or aids needed to assist spill evaluation?
- What sources of information were available on winds and on water currents?
- Is our information adequate?
- Was this information useful (and used) for spill trajectory forecasts? Were such forecasts realistic?
- Do we have adequate information on product properties?
- Do we need additional information on changes of product properties with time, i.e., as a result of weathering and other processes?

Mobilization

- What steps were taken to mobilize spill countermeasures?
- What resources were used?
- Was mobilization prompt?
- Could it have been speeded up or should it have been?
- What about mobilization of manpower resources?
- Was the local spill cooperative used appropriately?
- How could this be improved?
- Was it appropriate to mobilize the Pipeline owner/operator resources and was this promptly initiated?
- What other resources are available, and have they been identified and used adequately?

Response - Strategy

- Is there an adequate Spill Response Plan for the location?
- Is it flexible enough to cope with unexpected spill events?
- Does the Plan include clear understanding of local environmental sensitivities?
- What was the initial strategy for response to this spill?
- Is this strategy defined in the Spill Plan?
- How did the strategy evolve and change during this spill and how were these changes implemented?
- What caused such changes?
- Are there improvements needed? More training?

Response - Resources Used

- What resources were mobilized?
- How were they mobilized?
- How did resource utilization change with time? Why?
- Were resources used effectively?
    - Contractors
    - Government agencies
    - Company resources
    - Cooperatives
    - Volunteers
    - Consultants
    - Other (e.g., bird rescue centers)
- What changes would have been useful?
- Do we have adequate knowledge of resource availability?
- Do we have adequate knowledge of waste disposal capabilities?

Response - Effectiveness

- Was containment effective and prompt?
- How could it have been improved?
- Should the location or the local cooperative have additional resources for containment?
- Was recovery effective and prompt?
- How could it have been improved?
- Should the location or the local cooperative have additional resources for recovery of spilled product?
- Was contaminated equipment disposed promptly and safely?
- Was there adequate in-house product separation, recovery, and disposal?
- How could it have been improved?
- Was there adequate outside disposal resources available?

Command Structure

- Who was initially in charge of spill response?
- What sort of organization was initially set up?
- How did this change with time? Why?
- What changes would have been useful?
- Was there adequate surveillance?
- Should there be any changes?
- Were communications adequate?
- What improvements are needed? Hardware, procedures, etc.
- Was support from financial services adequate? Prompt?
- Should there be any changes?
- Is more planning needed?
- Should financial procedures be developed to handle such incidents?

Measurement

- Was there adequate measurement or estimation of the volume of product spilled?
- Was there adequate measurement or estimation of the volume of product recovered?
- Was there adequate measurement or estimation of the volume of product disposed?
- Should better measurement procedures be developed for either phase of operations?
- If so, what would be appropriate and acceptable?

Government Relations

- What are the roles and effects of the various government agencies which were involved?
- Was there a single focal point among the government agencies for contact?
- Should there have been better focus of communications to the agencies?
- Were government agencies adequately informed at all stages?
- Were too many agencies involved?
- Are any changes needed in procedures to manage government relations?
- Examples of affected U.S. agencies (there may be others):
    - U.S. Coast Guard
    - Environmental Protection Agency
    - National Oceanic and Atmospheric Administration
    - Dept of Fish and Wildlife
    - State Parks
    - Harbors and Marinas
    - States
    - Cities
    - Counties
- Was there adequate agreement with the government agencies on disposal methods?
- Was there adequate agreement with the government agencies on criteria for cleanup?
- How was this agreement developed?
- Were we too agreeable with the agencies in accepting their requests for specific action items (e.g., degree of cleanup)?
- Should there be advance planning of criteria for cleanup, aimed at specific local environmentally sensitive areas? (Such criteria should probably also be designed for different types of product.)

Public Relations

- How were relations with the media handled?
- What problems were encountered?
- Are improvements needed?
- How could public outcry have been reduced? Was it serious?
- Would it be useful to undertake a public information effort to "educate" reporters about product and effects to it if spilled?
- These areas should be investigated shortly after the incident to assure that actions taken are fresh in peoples' minds.

APPENDIX E Disposal Plan

E-1 Overview

A major oil spill response would generate significant quantities of waste materials ranging from oily debris and sorbent materials to sanitation water and used batteries. All these wastes need to be classified and segregated (i.e., oily, liquid, etc.), transported from the site, and treated and/or disposed at approved disposal sites. Each of these activities demands that certain health and safety precautions be taken, which are strictly controlled by Federal and State Laws and Regulations. This Section provides an overview of the applicable State Regulations governing waste disposal, and a discussion of various waste classification, handling, transfer, storage, and disposal techniques. It is the responsibility of the Environmental Unit to manage waste disposal needs during an oil spill cleanup.

E-2 Waste Classification

Hazardous Waste
Wastes generated during the response no matter their state, e.g. liquid, non-liquid, or semi-solid, are considered a solid waste per U.S. EPA regulations. Solid wastes are defined as any discarded material that is not specifically excluded under the regulations such as domestic sewage discharged through a sewer system or industrial wastewater point source discharge.

Some of the solid wastes generated during the response may be considered a hazardous waste. A solid waste may be a hazardous waste if it is not excluded from regulation and is either a listed hazardous waste or exhibits the characteristics of a hazardous waste. A solid waste exhibits the characteristics of a hazardous waste if it exceeds the thresholds established in determining the following:

1. ignitability
2. corrosivity
3. reactivity
4. toxicity

A solid waste may also become a hazardous waste if it is mixed with a listed hazardous waste or, in the case of any other waste (including mixtures), when the waste exhibits any of the characteristics identified above.

Oily- Liquid Wastes
Oily liquid wastes (i.e., oily water and emulsions) that would be handled, stored, and disposed during response operations are very similar to those handled during routine storage and transfer operations. The largest volume of oily liquid wastes would be produced by recovery operations (e.g., using vacuum devices or skimmers). In addition, oily water and emulsions would be generated by vehicle operations (e.g., spent motor oils, lubricants, etc.), and equipment cleaning operations.

Non-Oily - Liquid Wastes
Response operations would also produce considerable quantities of non-oily liquid wastes. Water and other non-oily liquid wastes would be generated by the storage area and stormwater collection systems,

equipment cleaning (i.e., water contaminated with cleaning agents), and office and field operations (i.e., sewage, construction activities).

Solid Wastes
Determination if a solid waste is a characteristic hazardous waste will be done through Toxicity Characteristic Leaching Procedure (TCLP) testing at a Company approved analytical laboratory and through generator knowledge.

Oily - Solid / Semi-Solid Wastes
Oily solid/semi-solid wastes that would be generated by containment and recovery operations include damaged or worn-out booms, disposable/soiled equipment, used sorbent materials, saturated soils, contaminated beach sediments, driftwood, and other debris.

Non-Oily - Solid / Semi-Solid Wastes
Non-oily solid/semi-solid wastes would be generated by emergency construction operations (e.g., scrap, wood, pipe, and wiring) and office and field operations (i.e., refuse). Vessel, vehicle, and aircraft operations also produce solid wastes.

E-3 Waste Handling

A primary concern in the handling of recovered oil and oily debris is contaminating unaffected areas or re-contaminating already cleaned areas. Oily wastes generated during the response operations would need to be separated by type and transferred to temporary storage areas and/or transported to incineration or disposal sites. Proper handling of oil and oily wastes is imperative to ensure personnel health and safety.

Safety Considerations
Care shall be taken to avoid or minimize direct contact with oily wastes. All personnel handling or encountering oily wastes shall wear protective clothing. A barrier cream can be applied prior to putting on gloves to further reduce the possibility of oily waste absorption. Safety goggles shall be worn by personnel involved in waste handling activities where splashing might occur. Any portion of the skin exposed to oily waste should be washed with soap and water as soon as possible. Decontamination zones should be set up during response operations to ensure personnel are treated for oil exposure.

Wastes Transfer
During response operations, it may be necessary to transfer recovered oil and oily debris from one point to another several times before the oil and oily debris are ultimately recycled, incinerated or disposed at an appropriate disposal site. Depending on the location of response operations, any or all the following transfer operations may occur:

- From portable or vessel-mounted skimmers into flexible bladder tanks, storage tanks of the skimming vessel itself, or a barge.
- Directly into the storage tank of a vacuum device.
- From a skimming vessel or flexible bladder to a barge.
- From a vacuum device storage tank to a barge.

- From a barge to a tank truck.
- From a tank truck to a processing system (e.g., oil/water separator).
- From a processing system to a recovery system and/or incinerator.
- Directly into impermeable bags that, in turn, are placed in impermeable containers.
- From containers to trucks.

There are four general classes of transfer systems that may be employed to affect oily waste transfer operations:

- Pumps: Rotary pumps, such as centrifugal pumps, may be used when transferring large volumes of oil, but they may not be appropriate for pumping mixtures of oil and water. The extreme shearing action of centrifugal pumps tends to emulsify oil and water, thereby increasing the viscosity of the mixture and causing low, inefficient transfer rates. The resultant emulsion would also be more difficult to separate into oil and water fractions. Lobe or "positive displacement" pumps work well on heavy, viscous oils, and do not emulsify the oil/water mixture. Double-acting piston and double acting diaphragm pumps are reciprocating pumps that may also be used to pump oily wastes.
- Vacuum Systems: A vacuum truck may be used to transfer viscous oils, but they usually pick up a very high water/oil ratio.
- Belt/Screw Conveyors: Conveyors may be used to transfer oily wastes containing a large amount of debris. These systems can transfer weathered debris laden oil either horizontally or vertically for short distances (i.e., 10 feet) but are bulky and difficult to set up and operate.
- Wheeled Vehicles: Wheeled vehicles may be used to transfer liquid wastes or oily debris to storage or disposal sites. These vehicles have a limited transfer volume (i.e., 100 barrels) and require good site access.

E-4 Waste Storage

Interim storage of recovered oil, oily and non-oily waste would be considered to be an available means of holding the wastes until a final management method is selected. In addition, the segregation of wastes, according to type, would facilitate the appropriate method of disposal. The storage method used would depend upon:

- The type and volume of material to be stored.
- The duration of storage.
- Access.

During an oil spill incident, the volume of oil that can be recovered and dealt with effectively depends upon the available storage capacity. Typical short-term storage options are summarized in Figure E-1. Many of these options can be used either onshore or offshore.

If storage containers such as bags or drums are used, the container must be clearly marked with the proper Canadian Transport Dangerous Goods/United States Department of Transportation marking to indicate the type of material/waste contained and/or the ultimate disposal option.

Fuel barges may be the best option for temporary storage of oil recovered in open waters and frac tanks for inland spills. Depending on size, these vessels may be able to hold up to 6,000 barrels of oil and water and frac tanks may hold up to 500-550 barrels. The barge deck can be used as a platform for operating oil spill clean-up equipment and storing containment boom.

Steel or rubber tanks can be used to store oil recovered near the shoreline. To facilitate offloading, de-emulsifiers may be used to break emulsions prior to placing the recovered substance into the barges or storage tanks.

Use of any site for storage is dependent on the approval of the local authorities. The following elements affect the choice of a potential storage site:

- Geology;
- Ground water;
- Soil;
- Flooding;
- Surface water;
- Slope;
- Covered material;
- Capacity;
- Climatic factors;
- Land use;
- Toxic air emissions;
- Security;
- Access; and/or
- Public contact.

E-5 Waste Disposal

Techniques for Disposal of Recovered Oil

Recovery, reuse, and recycling are the best choices for remediation of a spill, thereby reducing the amount of oily debris to be bermed onsite or disposed of at a solid waste landfill. Treatment is the next best alternative, but incineration and burning for energy recovery have more options within the United States. There are some limitations and considerations in incinerating for disposal. Environmental quality of incineration varies with the type and age of the facility. Therefore, when incineration becomes an option during an event, local air quality authorities would be contacted for advice about efficiency and emissions of facilities within their authority. Approval of the local air authorities is a requirement for any incineration option. Landfilling is the last option. Final disposal at a solid or hazardous waste landfill is the least environmentally sound method of dealing with a waste problem such as oily debris.

!	**NOTE:** Prior to the disposal of ANY waste products, the Incident Commander or his designee must contact TC Energy Pipeline Safety and Compliance – Oil Pipeline Environmental Services to receive direction and guidance on the proper disposal methods and procedures.

During an oil spill incident, the Company would consult with the proper regulating agency to identify the acceptable disposal methods and sites appropriately authorized to receive such wastes. The Company maintains a list of approved disposal sites that satisfy local, Province/State, and Federal Regulations and Company requirements. This identification of suitable waste treatment and disposal sites would be prepared by the Environmental Unit in the form of an Incident Disposal Plan which must be authorized by the USCG and/or the EPA or CER and any authorizing state agency.

An Incident Disposal Plan would include pre-designated interim storage sites, segregation strategies, methods of treatment and disposal for various types of debris, and the locations/contacts of all treatment and disposal site selections. Onsite treatment/disposal is preferred.

In order to obtain the best overall Incident Disposal Plan, a combination of methods should be used. There is no template or combination of methods that can be used in every spill situation. Each incident should be reviewed carefully to ensure that an appropriate combination of disposal methods is employed.

The different types of wastes generated during response operations would require different disposal methods. To facilitate the disposal of wastes, they should be separated by type for temporary storage, transport and disposal. Figure E-2 lists some of the options that would be available to segregate oily wastes. The figure also depicts methods that may be employed to separate free and/or emulsified water from the oily liquid waste.

The following is a brief discussion of some disposal techniques available for recovered oil and oily debris.

Recycling
This technique entails removing water from the oil and blending the oil with uncontaminated oil. Recovered oil can be shipped to refineries provided that it is exempt from hazardous waste regulations. There it can be treated to remove water and debris, and then blended and sold as a commercial product.

The Company's designated Disposal Specialist is responsible for ensuring that all waste materials be disposed at an internally approved disposal site.

Incineration
This technique entails the complete destruction of the recovered oil by high temperature thermal oxidation reactions. There are licensed incineration facilities as well as portable incinerators that may be brought to a spill site. Incineration may require the approval of the local Air Pollution Control Authority. Factors to consider when selecting an appropriate site for onsite incineration would include:

- Proximity to recovery locations;
- Access to recovery locations;
- Adequate fire control; and
- Approval of the local air pollution control authorities.

In Situ Burning / Open Burning
Burning techniques entail igniting oil or oiled debris and allowing it to burn under ambient conditions. These disposal techniques are subject to restrictions and permit requirements established by federal, province/state and local laws. They would not be used to burn Polychlorinated biphenyls, waste oil

containing more than 1,000 parts per million of halogenated solvents, or other substances regulated by the Environmental Protection Agency or Environment Canada. Permission for in situ burning may be difficult to obtain when the burn takes place near populated areas.

As a general rule, in situ burning would be appropriate only when atmospheric conditions will allow the smoke to rise several hundred feet and rapidly dissipate. Smoke from burning oil will normally rise until its temperature drops to equal the ambient temperature. Afterwards, it will travel in a horizontal direction under the influence of prevailing winds.

Landfill Disposal

This technique entails burying the recovered oil in an approved landfill in accordance with regulatory procedures. Landfill disposal of free liquids is prohibited by Federal Law in the United States.

With local health department approval, non-burnable debris, which consists of oiled plastics, gravel and oiled seaweed, kelp, and other organic materials, may be transported to a licensed, lined, approved municipal or private landfill and disposed of in accordance with the landfill guidelines and regulations. Landfill designation would be planned only for those wastes that have been found to be unacceptable by each of the other disposal options (e.g., recycling, energy recovery). Wastes will be disposed only at Company-approved disposal facilities. The Disposal Specialist is responsible for ensuring that all waste materials are disposed at a Company internally approved disposal site. Disposal at a non-approved facility would require approval by the Disposal Specialist prior to sending any waste to such a facility.

Figure E.1 Temporary Storage Methods

Container	Onshore	Offshore	Solids	Liquids	Notes
Barrels	x	x	x	x	May require handling devices. Covered and clearly marked.
Tank Trucks	x	x		x	Consider road access. Barge-mounted offshore.
Dump/Flat Bed Trucks, Roll-offs	x		x		Require impermeable liner and cover. Consider flammability of vapors at mufflers.
Barges		x	x	x	Liquids only in tanks. Consider venting of tanks.
Oil Storage Tanks	x	x		x	Consider problems of large volumes of water in oil.
Bladders	x	x		x	May require special hoses or pumps for oil transfer.
Frac Tanks	x			x	Consider road access.

Figure E.2 Oily Waste Separation and Disposal Methods

Type of Material	Separation Methods	Disposal Methods
Liquids		
Non-emulsified oils	• Gravity separation of free water	• Incineration • Use of recovered oil as refinery/production facility feedstock
Emulsified oils	• Emulsion broken to release water by: o heat treatment o emulsion breaking chemicals o mixing with sand o centrifuge o filter/belt press	• Use of recovered oil as refinery/production facility feedstock
Solids		
Oil mixed with sand and soil	• Collection of liquid oil leaching from sand during temporary storage • Extraction of oil from sand by washing with water or solvent • Removal of solid oils by sieving	• Incineration • Use of recovered oil as refinery/production facility feedstock • Direct disposal • Stabilization with inorganic material • Degradation through land farming or composting
Oil mixed with cobbles or pebbles	• Screening • Collection of liquid oil leaching from materials during temporary storage • Extraction of oil from materials by washing with water or solvent	• Incineration • Direct Disposal • Use of recovered oil as refinery/production facility feedstock
Oil mixed with wood and sorbents	• Screening • Collection of liquid oil leaching from debris during temporary storage • Flushing of oil from debris with water	• Incineration • Direct disposal • Degradation through land farming or composting for oil mixed with seaweed or natural sorbents

APPENDIX F Miscellaneous Forms

Forms and Exercise Documentation - File Maintenance Procedures
• Forms and exercise documentation records should be maintained in a separate file in the Facility's office filing system. • These files must be available for presentation upon request by regulatory agency personnel.

- F 7000-1 Accident Report – Hazardous Liquid Pipeline Systems
- Preliminary Incident Report
- Detailed Incident Report
- Unauthorized Activity
- South Dakota Supplemental Emergency Response and Equipment Statement
- Hazard/Damage Assessment Status Form
- Annex IX Guidance for Using Bioremediation in Response to Oil Spills in Region 8
- Appendix A to Regional Integrated Contingency Plan – EPA Region 7

When viewing this plan electronically, with access to the TC Energy Intranet, click the links above to view each form referenced. When viewing this plan without access to the TC Energy Intranet, these forms can be located on the USB Drive accompanying the controlled plan.

APPENDIX G Safety Data Sheets / Product Information

Shipped product is measured at the receipt point in the pipeline; at that time, the measured product is considered a “batch”. The product is again measured upon delivery to document the amount of product moved from receipt to delivery. TC Energy requires shippers to meet defined common product specifications for each product shipped, so the batch of product delivered for the shipper at the point of delivery may not be the same batch of product shipped, but it will meet the same specifications. This, in general terms, is how TC Energy batches products.

Complete Safety Data Sheets (SDS) for the products shipped on the Keystone Pipeline System can be viewed online through the 3E Company Portal by clicking the “SDS” tab, then searching the Product Name.

APPENDIX H Basics of Oil Spill Response

H-1 Dikes, Berms, and Dams

Dikes, berms, and dams are land-based tactics, with the objective of containing spilled oil and limiting spreading of oil slicks, thus minimizing impacts to the environment. Dikes, berms and dams are embankment structures built-up from the existing terrain, placed to contain and accumulate oil for recovery. These barriers can serve to:

- Contain and stabilize a contaminated area.
- Contain or divert oil on water or oil that has potential to migrate.
- Create cells for recovery.
- Use natural depressions to act as containment areas for recovery.

The tactic may be deployed in association with a recovery tactic, such as Shoreline Recovery or On-land Recovery. Dikes, berms, and dams are most effective when placed before oil arrives. Dikes, berms, and dams can also be used to exclude oil from a sensitive area, which is covered in the Beach Berms and Exclusion Dams tactic. The tactic can also be used in conjunction with an excavation tactic to enhance containment volumes (see Pits, Trenches, and Slots).

The general strategy is to:

1. Identify the location and trajectory of the spill or potential spill.
2. Plan a deployment configuration that best supports the operating environment and available resources.
3. Mobilize to the location and deploy response resources.
4. Construct the containment structure and ensure it does not leak.
5. Consider the need to remove any water-bottom that may collect beneath the oil inside the structure.
6. Monitor the containment structure on an appropriate basis.
7. If oil collects in the structure, utilize an appropriate recovery system for removal.

Tactic Description

This tactic involves building an embankment perpendicular to the flow of the oil slick or around a contaminated area. Dike, berm, and dam structures can be constructed with a wide variety of materials including: soil, gravel, snow, sandbags, oil boom, timbers and logs. Selection of the construction material depends on the operating environment, location, available materials, and whether the structure is to be temporary or permanent. The containment area should be lined with an impermeable membrane, such as plastic sheeting, to keep oil and oily water from leaking or migrating into the soil. The structure may include a method to regulate flow, such as a weir or spill way. Dikes, berms, and dams can be built by manual labor or with earth-moving equipment depending on the location and available resources.

Deployment Configurations

Berms

A containment berm can be constructed of available materials such as earth, gravel, or snow. Use earth-moving equipment or manual labor to construct the berm. Form the materials into a horseshoe shape ahead of the flow of oil. Use plastic sheeting to line the walls of a soil berm to prevent oil penetration. Sandbags filled with sand or other heavy material also make excellent containment barriers.

Dams

An underflow dam can be used when there is too much water flow to allow for a complete blockage of a drainage channel. The dam is built of earth, gravel, or other barriers such as sandbags or plywood sheets. Wherever possible, line the upstream side of the dam with plastic sheeting to prevent erosion and penetration of oil into the dam material.

Underflow dams use inclined culverts or pipes to move water downstream while leaving the spill contained behind the dam. The capacity of the pipe(s) should exceed the stream flow rate. It may be necessary to use pumps to remove water behind a dike. Valves or culvert plugs can also be used to control flow rate.

Pipes must be placed on the upstream side of the dam, with the elevated end on the downstream side. Make sure that the upstream end of the pipe is submerged and below the oil/water interface. The height of the elevated downstream end of the pipe will determine the water level behind the dam.

Existing Roads

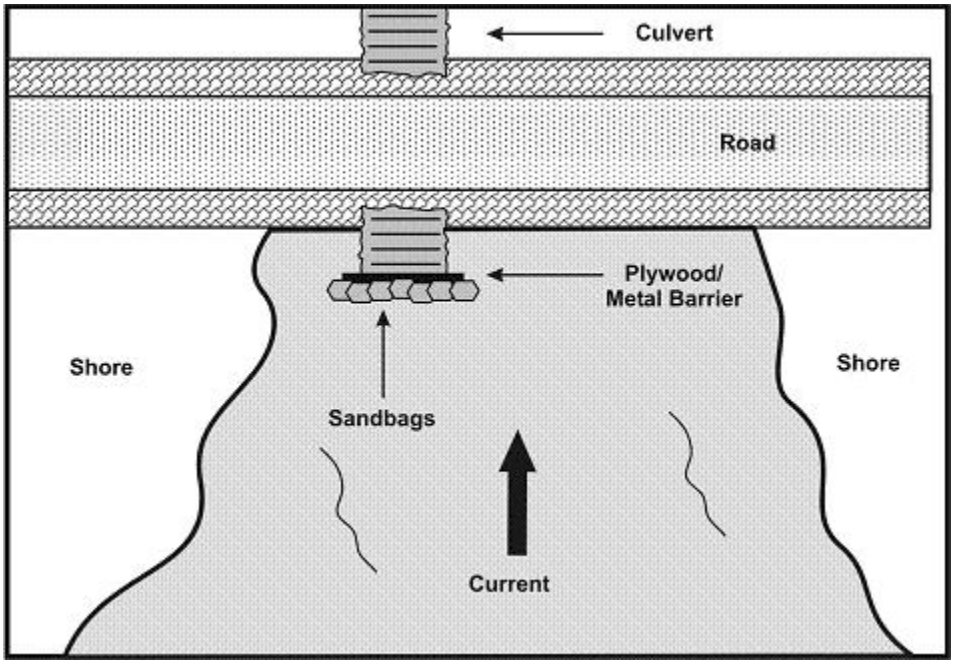
Roadways that are built up above the terrain can be used as dikes. However, road construction usually allows for natural drainage through culverts or bridges. These drainage structures must be controlled to turn the road into a barrier.

Culvert Blocking

A culvert can be blocked using sheet metal, plywood barriers, or inflatable culvert plugs. Use a full block only when the culvert will be blocked for the entire cleanup operation, if the oil floating on the water will not contaminate additional soil or tundra, and if blocking the water flow will not threaten the road. Otherwise, an adjustable weir or culvert plug should be used.

Plywood and/or sandbags can also be used as culvert blocks but are more labor-intensive and pose a higher potential for injury. A wood block may require a headwall with kickers oriented to support the boards or plywood. Place the blocking materials over the upstream end of the culvert. Plastic sheeting over the outside of the block will prevent oil penetration.

Figure H.1 Culvert Blocking



Earth Moving Equipment

A bulldozer, road grader, or front-end loader drives around the spill with its blade angled towards the spill, pushing earth or snow into a berm. Once the perimeter has been covered with an initial berm, shore-up areas as necessary.

Snow

Because of the absorbent quality of snow, it makes an excellent berm for both containment and recovery. A snow berm can be strengthened by spraying it with a fine water mist that forms an ice layer on top of the snow. A snow berm is built around the areas of heaviest oiling to contain oil or diesel spilled to tundra and/or ice in winter.

Mesh Fence

Plastic mesh fencing may be used to quickly construct an underflow dam system. The mesh fencing is placed across the drainage and held in place with stakes. Absorbent boom, oil boom, plywood, or even dry dead grass can be placed on the upstream side of the fencing. Running water will find its way under the barrier fence, but oil floating on top of the water will be trapped. The advantages of this system are that it is lightweight and mobile.

H-2 Deflection Boom

Objective & Strategy

The objective is to direct spilled oil away from a location to be protected or simply to change the course of the slick. “Deflection” is used to describe the tactic where oil is redirected away from an area but not recovered.

Tactic Description

The boom is placed at an optimum angle to the oil trajectory, using the movement of the current to carry oil along the boom and then releasing it into the current again with a new trajectory. The angle is chosen to prevent oil from entraining beneath the boom skirt. Boom may be held in place by anchors, vessels, or a boom control device.

Deflection Boom may be used to temporarily avoid impacts to a sensitive area, but there is no recovery associated with the tactic, thus no oil is removed from the environment.

The general strategy is to:

1. Identify the location and trajectory of the spill or potential spill.
2. Identify, prioritize, and select sensitive areas to be protected from impact.
3. Select a deployment configuration that best supports the operating environment and available resources.
4. Mobilize to the location and deploy the tactic.
5. Place boom using secured anchor systems, mooring points, vessels, boom control devices, etc.
6. Monitor and adjust the boom on an appropriate basis.

Boom Angle

Select the appropriate boom angle to keep oil from entraining under the boom. Where currents exceed 3 knots the boom must be almost parallel to the current to prevent entrainment. In currents exceeding 3 knots, a cascade of boom arrays may be used; the first boom array will slow the velocity of the slick allowing subsequent arrays to deflect the oil.

Anchor Systems

Boom is secured in place using standard anchoring systems. Anchor sizes vary depending on the boom type and the operating equipment.

Deployment Configurations

Single Boom

Boom is deployed from a site at an optimum angle to the current and anchored to deflect the oil away from a location. Figures H.2 and H.3 illustrate two single boom deflection techniques.

Figure H.2 Deflective Booming Technique (Single Boom Method)

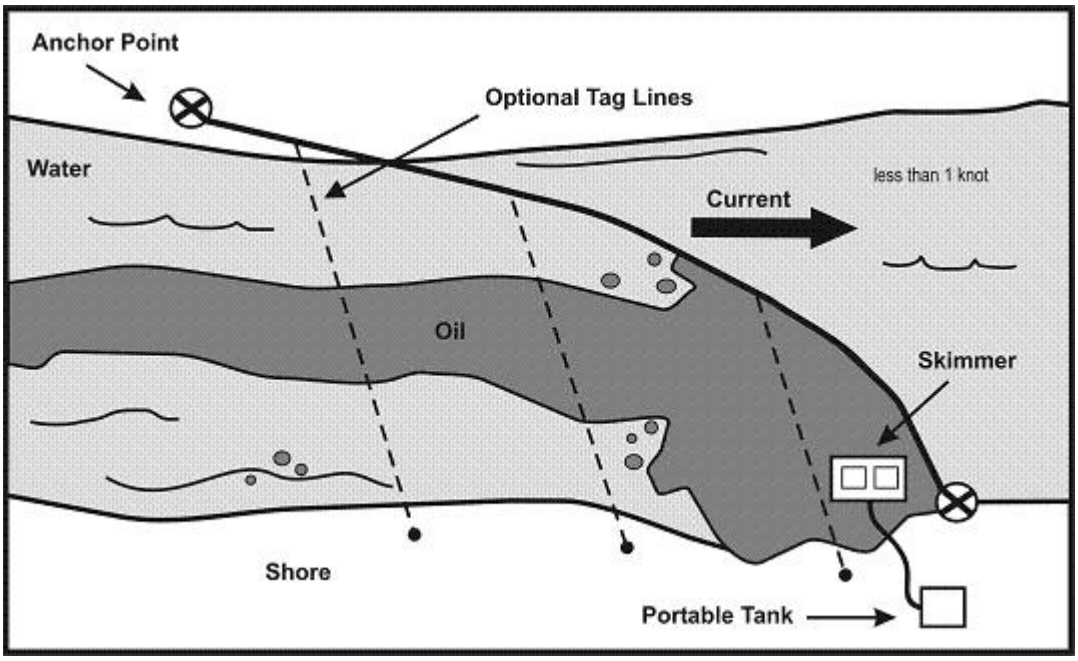


Figure H.3 Deflective Booming Technique (Trolley Method)

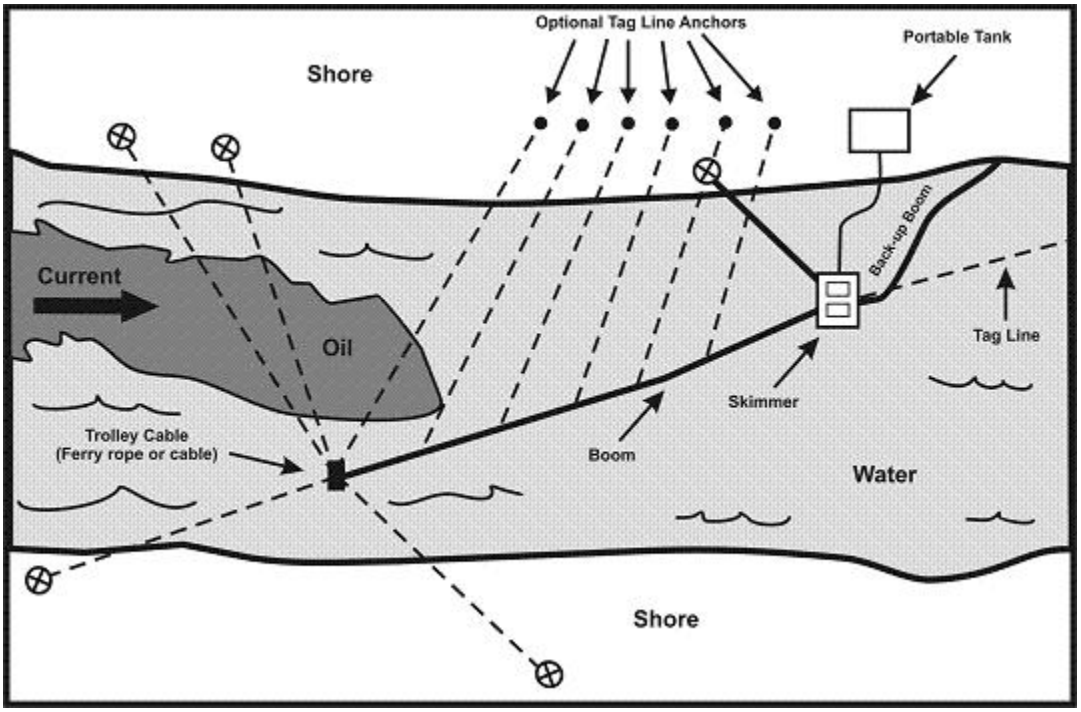
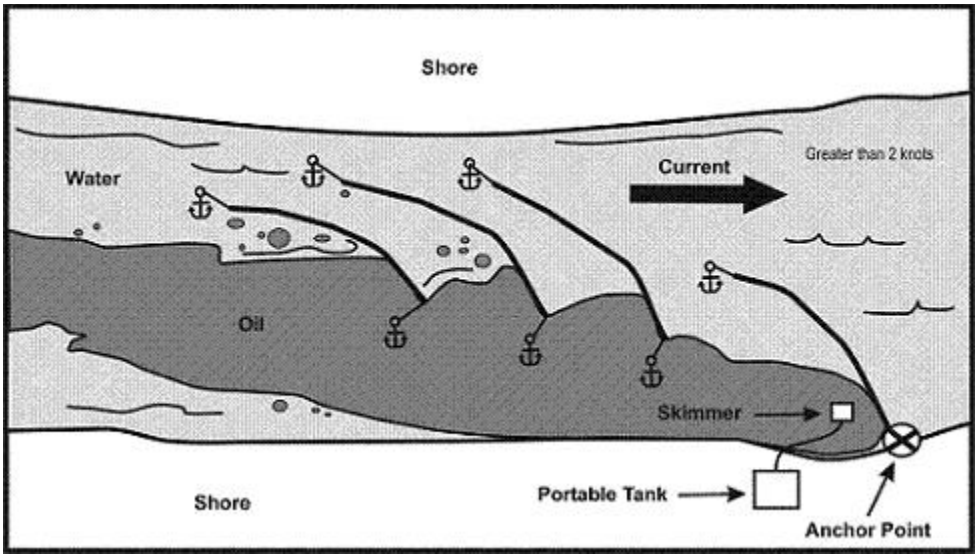


Figure H.4 Deflective Booming Technique (Cascade Method)



Cascade

Several booms are deployed in a cascade configuration when a single boom cannot be used because of fast current or because it is necessary to leave openings in the boom for vessel traffic, etc. This configuration can be used in strong currents where it may be impossible to effectively deploy one continuous section of boom. Shorter sections of boom used in a cascade deployment are easier to handle in faster water, thereby increasing efficiency. Additional equipment may be required to set and maintain this system as compared to the single boom configuration.

H-3 Containment Boom

Objective & Strategy

Containment booming is a fixed-boom tactic. The objective is to corral spilled oil on the water, usually near the source, thus minimizing spreading and impacts to the environment. It is usually deployed with Shoreline Recovery.

This tactic can be deployed for oil spill migrating downstream or downhill to water or through water.

The general strategy is to:

1. Identify the location and trajectory of the spill or potential spill.
2. Select a deployment configuration that best supports the operating environment and available resources.
3. Mobilize to the location and deploy the tactic.
4. Place boom, using secure anchor system or mooring points.
5. Monitor the boom on an appropriate basis.
6. If oil collects in the boom, utilize an appropriate recovery tactic to remove it.

Tactic Description

Containment boom systems are comprised of the appropriate oil boom for containment and concentration, and anchoring systems to hold the boom in place.

Containment boom systems are not recommended for the fast water environment because of the high probability of fixed-boom failure and the difficulty of anchoring in this environment.

Containment boom systems are not recommended for the broken ice environment, because of the high probability of fixed-boom failure and loss due to ice encounters.

Anchoring systems are often deployed first and then the boom is set from one anchor to the adjacent anchor. Boom can be placed from shoreline to shoreline.

A second layer of containment boom, outside the primary boom, has two advantages:

1. It breaks the sea chop and reduces its impact on the primary boom,
2. It may capture oil that has escaped if the primary boom fails.

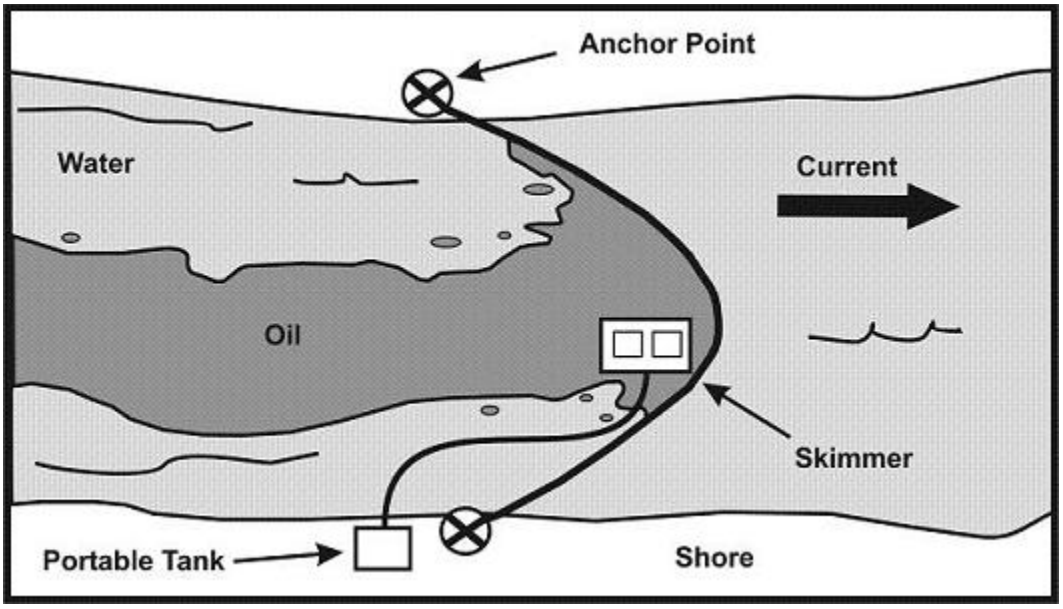
Figure H.5 illustrates a simple containment booming technique.

Deployment Considerations

- It is often advisable to "line" the containment boom with sorbent materials (passive recovery) to recover the sheen and reduce decontamination costs.
- If the oil slick is moving, due to wind or current, consider containment at the source and ahead of the leading edge.

- If spill is moving in excess of 1 knot, consider the Diversion Boom Tactic.
- Anchor systems must be selected based on the maximum stress that might be expected to occur on the boom array, considering stronger currents and winds than when the anchor is set.
- Site conditions will influence deployment configuration options.
- Combinations of Containment Boom and Diversion Boom tactics are often used together to optimize success.

Figure H.5 Containment booming Technique (Catenary Method)



H-4 Diversion Boom

Objective & Strategy

The objective is to redirect the spilled oil from one location or direction of travel to a specific site for recovery. For the purposes of maintaining consistent and clear terms, diversion is always associated with oil recovery, in contrast with the term deflection, which is used to describe the tactic where oil is redirected away from an area but not recovered.

Tactic Description

The Diversion Boom tactic is for water-born spills where there is some current, usually from 0.5 to 3.0 knots. The boom is placed at an optimum angle to the oil trajectory, using the movement of the current to carry oil along the boom to a recovery location. The angle is chosen to prevent oil from entraining beneath the boom skirt. Oil can be diverted to a shoreline or away from a shoreline or shoal waters. This tactic is always associated with a Shoreline Recovery. Figures H.6 and H.7 illustrate two diversionary booming techniques. These techniques are the Open Chevron and the Closed Chevron technique respectively.

Figure H.6 Open Chevron Booming Technique

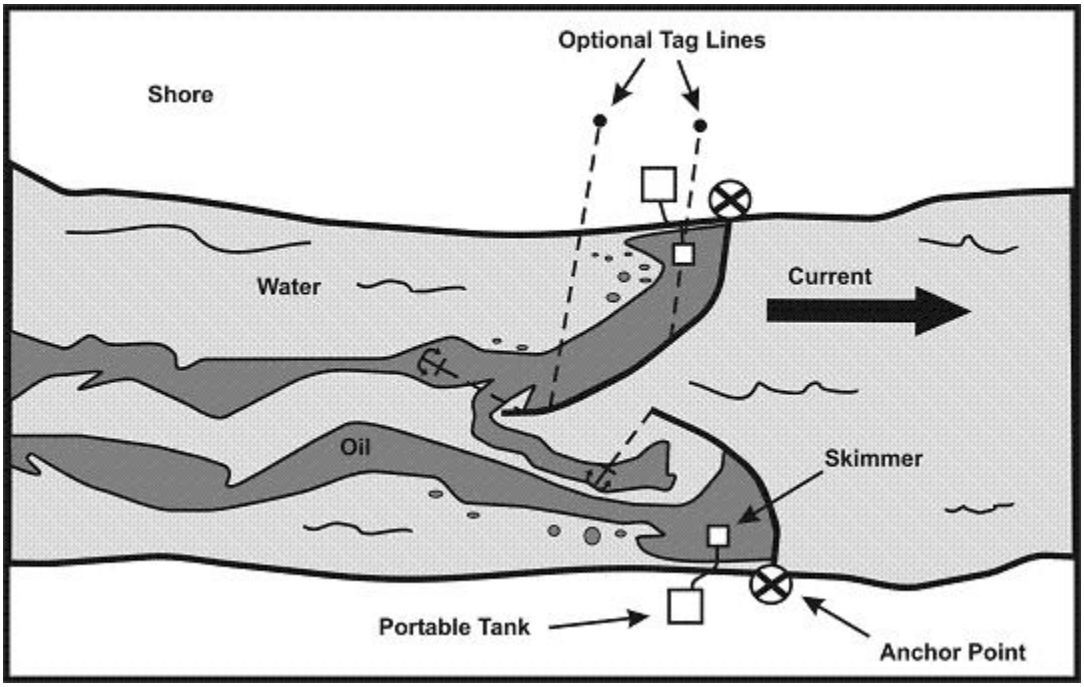
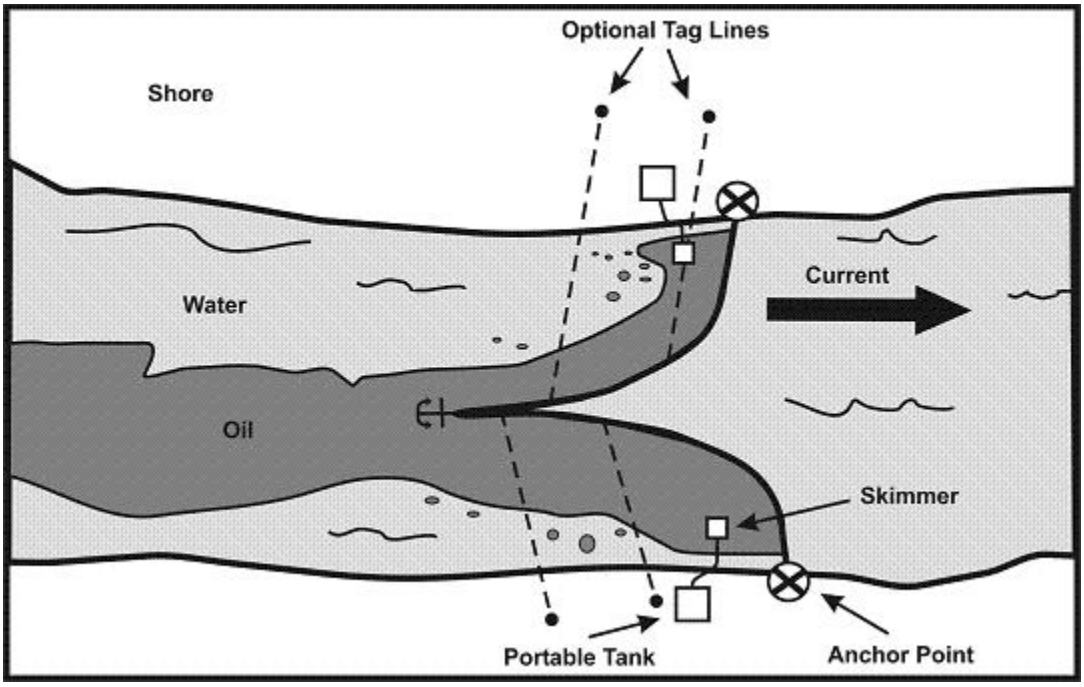


Figure H.7 Closed Chevron Booming Technique



Anchor Systems

Boom is secured in place using standard anchoring systems. Anchor sizes vary depending on the boom type and the operating environment.

Boom Angle

Select the appropriate boom angle to keep oil from entraining under the boom. The angle relative to the current decreases rapidly as the current increases. Where currents exceed 3 knots the boom must be almost parallel to the current to prevent entrainment. In currents exceeding 3 knots, a cascade of boom arrays may be used; the first boom array will slow the velocity of the slick allowing subsequent arrays to deflect the oil.

Single Boom

A basic diversion technique is to divert oil from a current to a recovery site along a shoreline. The recovery site is chosen where there is minimal current and a suitable recovery system can be deployed. The boom is then anchored at the site and deployed at an optimum angle to the current and secured/anchored to divert the oil to the shoreline for recovery.

H-5 Shoreline Recovery

Objective & Strategy

The objective is to remove spilled oil that has been diverted to a designated recovery site accessible from the shore.

Shoreline Recovery is usually deployed as part of another tactic, such as Diversion Boom strategy. When deployed in conjunction with another tactic, fewer personnel may be required.

The general strategy is to:

1. Identify the primary recovery site.
2. Assess site conditions and access routes.
3. Determine the appropriate recovery and storage systems based on oil type, access, and deployment restrictions.
4. Mobilize and deploy equipment to recover and temporarily store the oil from the recovery site.
5. Take precautions to minimize contamination of the shoreline at the collection site.
6. Man and monitor the system as appropriate.
7. Store and transfer recovered oil and oily water according to an approved waste management plan.

Tactic Description

Shoreline recovery systems can be deployed from land access routes (beaches, all-terrain vehicles), or water access. Access to the recovery site and the oil type will influence/dictate the options of equipment to be used.

Skimming Systems

Shoreline recovery requires at least one portable skimming system to remove spilled oil. The typical portable skimming system includes:

- Skimmer with pump and power pack
- Hose (suction and discharge with fittings)
- Oil transfer and decanting pump(s)
- Repair kit (tools and extra parts)

There are many models of skimmers to choose from, but they all fall into three types:

- Weir skimmers draw liquid from the surface by creating a sump in the water into which oil and water pour. The captured liquid is pumped from the sump to storage. Weir skimmers can recover oil at high rates, but they can also recover more water than oil, especially when the oil is in thin layers on the surface of the water. This creates the need to separate the water from the oil and decant it back into the environment. Otherwise, the recovered water takes available storage volume. Weir skimmers are best employed where oil has been concentrated into thick pools or where there are very large volumes of oil and recovered liquid storage capacity.

- Oleophilic skimmers pick up oil that adheres to a collection surface, leaving most of the water behind. The oil is then scraped from the collection surface and pumped to a storage device. Oleophilic skimmers do not recover oil as fast as weir skimmers, but they have the advantage of recovering very little water. Oleophilic skimmers may be used where oil is very thin on the surface. Oleophilic skimmers are a good choice where liquid storage capacity is limited.
- Suction skimmers use a vacuum to lift oil from the surface of the water. These skimmers require a vacuum pump or air conveyor system. Like weir skimmers, suction skimmers may also collect large amounts of water if not properly operated. Most suction skimmers are truck mounted and work best at sites with road access.

Primary Oil Storage Devices

Primary oil storage devices for shoreline recovery can be portable tanks, bladders, or truck-mounted tanks on the shoreline. If access is not restricted, larger systems can be used and deployed by heavy lifting equipment. If the site is accessible by road, vacuum trucks may be used for oil recovery, storage, and transport.

Recovery Location

Selection of a shoreline recovery location is critical to the success of this tactic. A recovery site should be in calm water with minimal currents. The site must have enough level ground to set up and operate a power pack and portable tanks. Sites with road access are preferred, but if not available, the site must have some other suitable access. Shelter, food and water for the response crew must also be considered in selecting a site.

H-6 Ice Operations

Objective & Strategy

Much like that of diversion booming, the objective is to redirect the spilled oil from one location or direction of travel to a specific site for recovery. With a layer of ice preventing the use of booming equipment, other response strategies must be employed.

Tactic Description

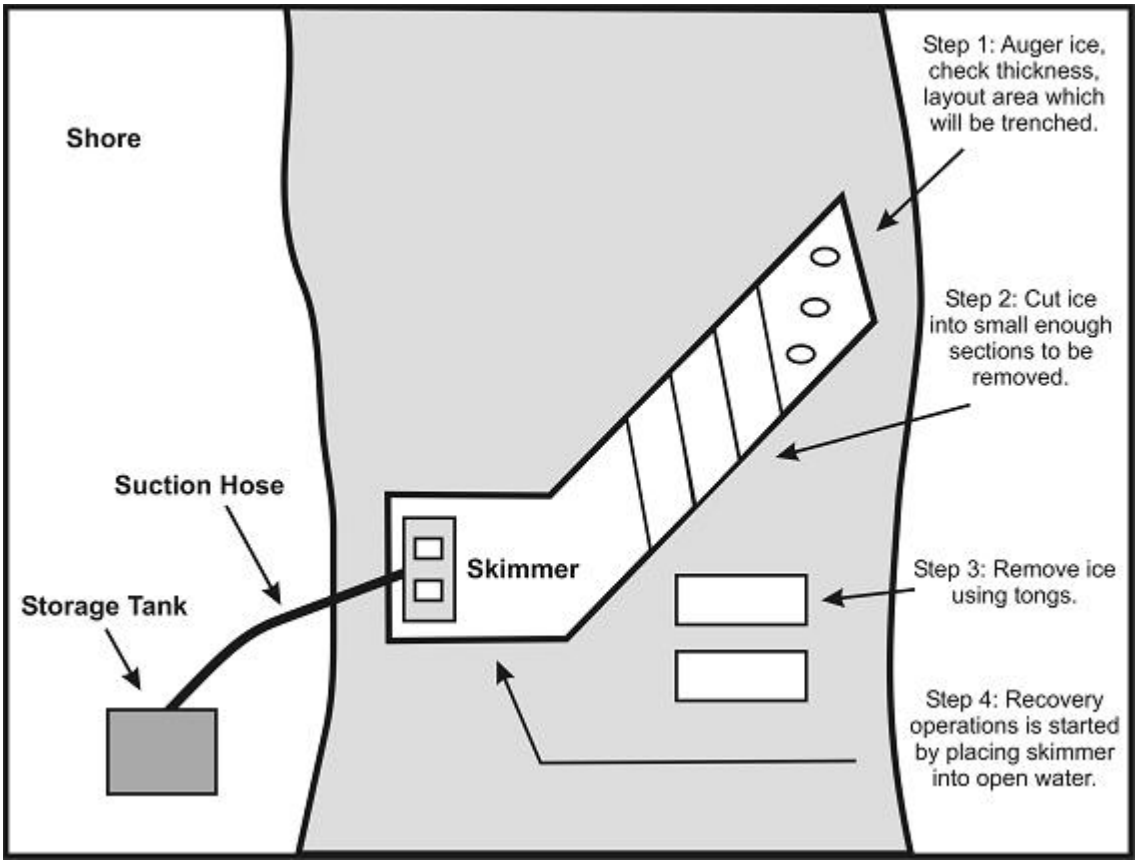
Ice Slotting

Ice slotting (Figure H.8) may be used in cases where the ice is thick enough to support the response equipment and personnel. Consideration for the weakening and cracking of the ice must be taken when conducting ice slotting operations.

Slotting Angle

The slot should be angled at approximately 30 degrees to the river's edge. The slotting needs to be wide enough to place a skimming system into the water to recover the oil. The lead end of the slot should have a slight curve which parallels the river current to allow the current to push the oil towards the recovery area.

Figure H.8 Ice Slotting Technique



Deflection Boards

In place of using booming equipment it may be possible to use flat boards, such as plywood, to divert the oil under the ice into a recovery area, which has been cut out. To use this form of diversion, the depth of the water under the ice and the speed of the current ice must be considered. The angle in which the boards are placed is derived much like that of deflection booming. In any current above 3 knots, a series of cascading boards should be considered. Also, the depth of the water must be considered. The stronger the current the deeper the boards must be placed to prevent entrainment. If the water is not deep enough to place the boards to prevent entrainment, ice slotting methods may be required. Figure H.9 illustrates the overall method of using deflective boards. Figure H.10 illustrates a close up of the deflective board response method.

Figure H.9 Deflective Boards recovery Strategy

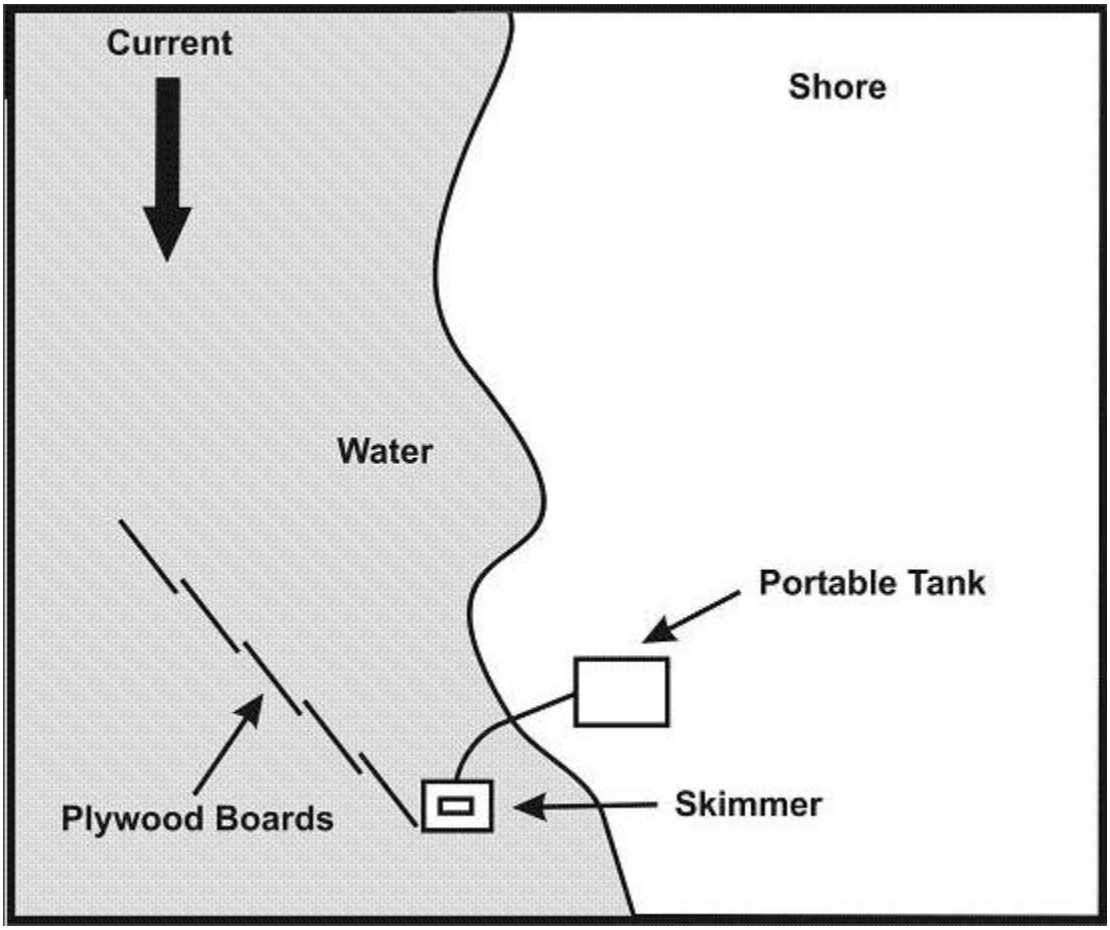
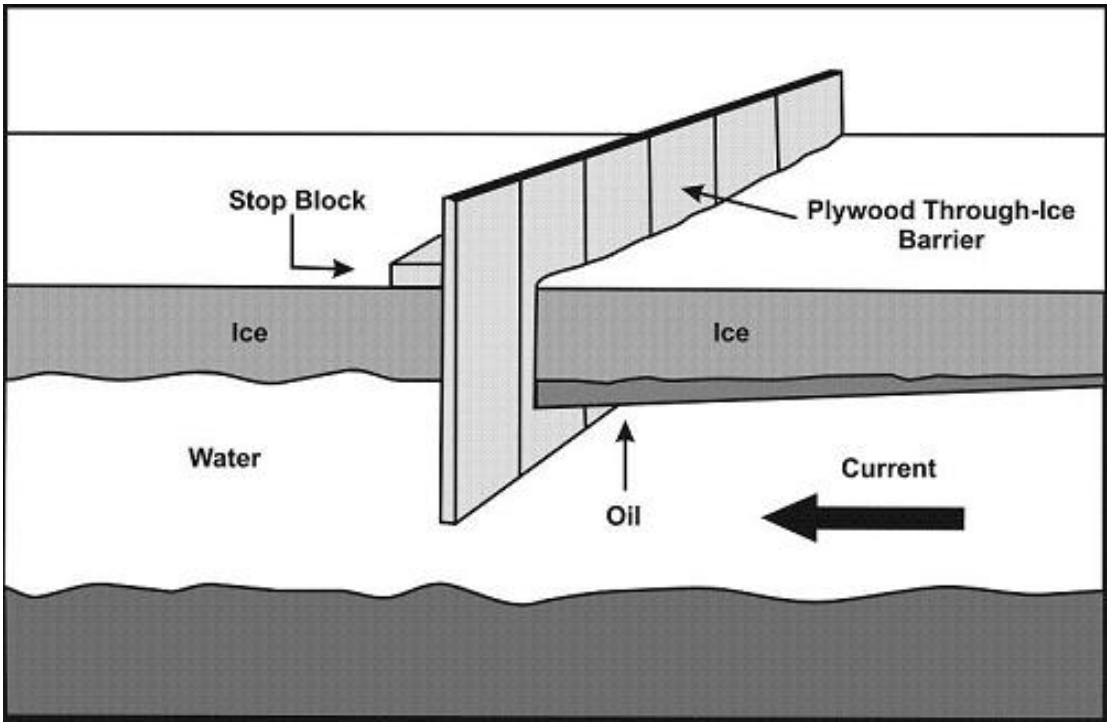


Figure H.10 Close Up View of the Deflective Board Strategy



APPENDIX I MEDIA RELATIONS

Specific guidance, policies, and procedures for Media Relations during an emergency are maintained in TC Energy's Incident Communications Guide. This Appendix simply summarizes TC Energy's goals and objectives related to Media Relations during an emergency.

Goals

- Provide a coordinated communications response to ensure appropriate information is disseminated in an accurate and timely manner
- Communicate concisely the nature of the emergency, the steps being taken to address it, and the effectiveness of those measures
- Control the communications environment as much as possible in an effort to protect the reputation of the Company

Objectives during Emergencies

- Provide as much relevant information as possible about how the Company is responding to the incident to build and maintain stakeholders/rights-holders and media trust.
- Present an accurate, compassionate and up-to-date account of the incident.
- Balance the resolution of the technical emergency while managing human issues.
- Maintain an accurate record of what is happening, and actions being taken to respond to the incident.
- Present a positive and accurate perception of the Company.
- Identify factual and interpretative errors and develop a strategy to respond.
- Bring positive developments to the forefront quickly.
- Prepare spokespersons to deliver the message.
- Communicate the policies, attitudes and actions of the Company to convey that the organization has a plan in place to deal with the incident.
- Maintain credibility in the communication process by ensuring consistency in the message and the information being disseminated.

Regulatory Cross Reference

DOT/PHMSA 49 CFR Part 194 Cross Reference

DOT/PHMSA - 49 CFR PART 194		
§ 194.105	**Brief Description**	**Location in Plan**
(a)	… determine the worst case discharge … provide methodology, including calculations, used to arrive at the volume.	App B
(b)	The worst case discharge is the largest volume, in barrels, of the following:	-----
(b)(1)	… maximum release time in hours, plus the maximum shutdown response time in hours, multiplied by the maximum flow rate expressed in barrels per hour, plus the largest line drainage volume after shutdown of the line section(s) …; or	App B
(b)(2)	The largest foreseeable discharge for the line section(s) within a response zone, expressed in barrels, based on the maximum historic discharge, if one exists, adjusted for any subsequent corrective or preventative action taken; or	App B
(b)(3)	If the response zone contains one or more breakout tanks, the capacity of the single largest tank or battery of tanks within a single secondary containment system, adjusted for the capacity or size of the secondary containment system, expressed in barrels.	App B
(b)(4)	Operators may claim prevention credits for breakout tank secondary containment and other specific spill prevention measures as follows….	App B
§ 194.107	**Brief Description**	**Location in Plan**
(a)	Each response plan must plan for resources for responding, to the maximum extent practicable, to a worst case discharge, and to a substantial threat of such a discharge.	App A
(b)	An operator must certify in the plan … reviewed NCP and each applicable ACP…	Foreword
(b)(1)	As a minimum to be consistent with the NCP as a facility response plan must:	-----
(b)(1)(i)	Demonstrate an operator's clear understanding of the function of the Federal response structure…	§ 4.0
(b)(1)(ii)	Establish provisions to ensure the protection of safety at the response site; and	§ 4.0 (Command), § 5.0
(b)(1)(iii)	Identify the procedures to obtain any required Federal and State permissions for using alternative response strategies such as in-situ burning and dispersants…	§ 6.7, App. E
(b)(2)	As a minimum, to be consistent with the applicable ACP the plan must:	-----

(b)(2)(i)	Address the removal of a worst case discharge and the mitigation or prevention of a substantial threat of a worst case discharge;	§ 3, App B
(b)(2)(ii)	Identify environmentally and economically sensitive areas;	§ 6.0
(b)(2)(iii)	Describe the responsibilities of the operator and of Federal, State and local agencies in removing a discharge and in mitigating or preventing a substantial threat of a discharge; and	§4.0
§ 194.107 (cont.)	**Brief Description**	**Location in Plan**
(b)(2)(iv)	Establish the procedures for obtaining an expedited decision on use of dispersants or other chemicals.	§ 6.8
(c)	Each response plan must include:	-----
(c)(1)	A core plan consisting of …	-----
(c)(1)(i)	An information summary as required in § 194.113,	Fig 1.1
(c)(1)(ii)	Immediate notification procedures,	§ 2.0
(c)(1)(iii)	Spill detection and mitigation procedures,	§ 3.0
(c)(1)(iv)	The name, address, and telephone number of the oil spill response organization, if appropriate,	Fig 2.5, App A
(c)(1)(v)	Response activities and response resources,	§ 3.0, App A
(c)(1)(vi)	Names and telephone numbers of Federal, State, and local agencies which the operator expects to have pollution control responsibilities or support,	Fig 2.5
(c)(1)(vii)	Training procedures,	App D
(c)(1)(viii)	Equipment testing,	App D.2
(c)(1)(ix)	Drill program - an operator will satisfy the requirement for a drill program by following the National Preparedness for Response Exercise Program (PREP) guidelines. An operator choosing not to follow PREP guidelines must have a drill program that is equivalent to PREP. The operator must describe the drill program in the response plan and PHMSA will determine if the program is equivalent to PREP.	App D.2
(c)(1)(x)	Plan review and update procedures;	§ 1.4
(c)(2)	An appendix for each response zone that includes the information required in paragraph (c) (1) (i)-(ix) of this section and the worst case discharge calculations that are specific to that response zone. An operator submitting a response plan for a single response zone does not need to have a core plan and a response zone appendix. The operator of a single response zone onshore pipeline shall have a single summary in the plan that contains the required information in § 194.113.7; and.	Annexes
(c)(3)	A description of the operator's response management system including the functional areas of finance, logistics, operations, planning, and command. The plan must demonstrate that the operator's response management system uses common terminology and has a manageable span of control, a clearly defined chain of command, and sufficient trained personnel to fill each position.	§ 4.0

§ 194.111	Brief Description	Location in Plan
(a)	Each operator shall maintain relevant portions of its response plan at the operator's headquarters and at other locations from which response activities may be conducted, for example, in field offices, supervisor's vehicles, or spill response trailers.	Foreword Distribution List
(b)	Each operator shall provide a copy of its response plan to each qualified individual	Foreword Distribution List
§ 194.113	**Brief Description**	**Location in Plan**
(a)	The information summary for the core plan, required by § 194.107, must include:	-----
(a)(1)	The name and address of the operator.	Fig 1.1
(a)(2)	For each response zone which contains one or more line sections that meet the criteria for determining significant and substantial harm as described in § 194.103, a listing and description of the response zones, including county(s) and state(s).	Fig 1.1, Response Zone Annexes
(b)	The information summary for the response zone appendix, required in § 194.107, must include:	-----
(b)(1)	The information summary for the core plan.	Fig 1.1
(b)(2)	The names or titles and 24-hour telephone numbers of the qualified individual(s) and at least one alternate qualified individual(s);	Fig 1.1, Fig 2.2
(b)(3)	The description of the response zone, including county(s) and state(s), for those zones in which a worst case discharge could cause substantial harm to the environment.	Fig 1.1, Response Zone Annexes
(b)(4)	A list of line sections for each pipeline contained in the response zone, identified by milepost or survey station number, or other operator designation.	Fig 1.1
(b)(5)	The basis for the operator's determination of significant and substantial harm.	Foreword
(b)(6)	The type of oil and volume of the worst case discharge.	App B
§ 194.115	**Brief Description**	**Location in Plan**
(a)	Each operator shall identify and ensure, by contract or other approved means, the resources necessary to remove, to the maximum extent practicable, a worst case discharge and to mitigate or prevent a substantial threat of a worst case discharge.	App A
(b)	An operator shall identify in the response plan the response resources which are available to respond within the time specified, after discovery	App A

	of a worst case discharge, or to mitigate the substantial threat of such a discharge.	
§ 194.117	**Brief Description**	**Location in Plan**
(a)	Each operator shall conduct training to ensure that:	-----
(a)(1)	All personnel know --	-----
(a)(1)(i)	Their responsibilities under the response plan	
(a)(1)(ii)	The name and address of, and the procedure for contacting, the operator on a 24-hour basis	§ 4.0
(a)(1)(iii)	The name of, and procedures for contacting, the qualified individual on a 24-hour basis	§ 2.0, Fig 2.2
(a)(2)	Reporting personnel know --	-----
(a)(2)(i)	The content of the information summary of the response plan.	Fig 1.1
(a)(2)(ii)	The toll-free telephone number of the National Response Center	Fig 2.5
(a)(2)(iii)	The notification process	§ 2.0, Fig 2.5
(a)(3)	Personnel engaged in response activities know --	-----
(a)(3)(I)	The characteristics and hazards of the oil discharged	Fig 3.0, App G
(a)(3)(ii)	The conditions that are likely to worsen emergencies, including the consequences of facility malfunctions or failures, and the appropriate corrective actions.	§ 3.0
(a)(3)(iii)	The steps necessary to control any accidental discharge of oil and to minimize the potential for fire, explosion, toxicity, or environmental damage	§ 3.0
(a)(3)(iv)	The proper firefighting procedures and use of equipment, fire suits, and breathing apparatus	§ 3.0
(b)	Each operator shall maintain a training record for each individual that has been trained as required by this section. These records must be maintained in the following manner as long as the individual is assigned duties under the response plan	App D.1
(b)(1)	Records for operator personnel must be maintained at the operator's headquarters	App D.1
(b)(2)	Records for personnel engaged in response, other than operator personnel, shall be maintained as determined by the operator.	App D.1
(b)(3)	Nothing in this section relieves an operator from the responsibility to ensure that all response personnel are trained to meet the OSHA standards for emergency response operations in 29 CFR 1910.120 ...	App D.1

§ 194.119	Brief Description	Location in Plan
(a)	Each owner shall submit two copies...	Distribution
(b)	...PHMSA will notify the operator of any alleged deficiencies...	-----
(c)	The operator...may petition PHMSA for reconsideration within 30 days...	-----
(d)	...PHMSA will approve the Response Plan...	-----
(e)	...The operator may submit a certification to PHMSA...that the operator has obtained, through contract or other approved means, the necessary private personnel and equipment to record, to the maximum extent practicable, to a worst case discharge...	Foreword (Operator's Statement)
(f)	...PHMSA may require an operator to provide a copy of the response plan to the OSC...	-----
§ 194.121	**Brief Description**	**Location in Plan**
(a)	Each operator shall update its response plan to address new or different operating conditions or information. In addition, each operator shall review its response plan in full at least every 5 years from the date of the last submission or the last approval as follows:	§ 1.4
(a)(1)	For substantial harm plans, an operator shall resubmit every 5 years from the last approval date.	§ 1.4

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S 32-34	**Brief Description**	**Location in Plan**
-----	Directions for Use of Manual;	§ 1.0
-----	Emergency Preparedness and Response Policy;	§ 3.0
-----	Description of Initial Responses to Incident Calls;	§ 3.0
-----	Management of Threat Information;	§ 3.0
-----	Definitions and Levels of Emergencies;	§ 3.0
-----	Corporate and Operational Chains of Command;	§ 4.0
-----	Internal and External Contact Lists;	Fig. 2.2, 2.5
-----	External Communication Information (e.g. media outlets);	App. I
-----	Description of General and Site Specific Emergency Response Procedures;	§ 3.0
-----	Roles and Responsibilities (e.g. checklist of duties);	§ 4.0
-----	Site-Specific Emergency Information (e.g. control points);	Fig. 6.1
-----	Lists of Persons in Emergency Planning Zones (or on separate file);	Fig. 2.2
-----	Environmental or Other Areas Requiring Special Consideration or Protection;	§ 6.0
-----	Detailed Product Information (e.g. SDS);	App. G
-----	Description and Location of Response Equipment;	App. A
-----	Internal and External Reporting Requirements;	§ 2.0
-----	Area Maps;	Fig. 1.2
-----	Training Requirements;	App. D
-----	Role of Government Departments;	§ 4.6
-----	Manual Updating Procedure and Schedule;	§ 1.4
-----	Forms and Records; and	App. F
-----	Manual Distribution List.	Foreword

Annex A to CAN/CSA-Z731-03

SAMPLE TABLE OF CONTENTS AN EMERGENCY PREPARDNESS MANUAL	
Reference	**Location in Plan**
1 Administration	-----
1.1 Emergency Preparedness Policy	Sec. 1.1
1.2 Purpose of This Manual	Sec. 1.2
1.3 Distribution of This Manual	Foreword, Sec. 1.3
1.4 Definitions	Glossary of Terms/Acronyms
2 Organization of Emergency Areas	Annexes
3 Roles and Responsibilities	Sec. 4.0
4 Communications	App. A.6
5 Emergency Response	-----
5.1 Emergencies Caused by Human Activity	Fig. 3.0
5.2 Natural Disasters	Fig. 3.0
6 Emergency Resources	-----
6.1 Contact List	Fig 2.2, 2.5
6.2 Personnel/Equipment	App. A
7 Training	-----
7.1 Employees	App. D.1
7.2 Contractors	App. D.1
7.3 Training Drills	App. D.2
8 Checklists	App. F
8.1 Role Checklists	App. F
8.2 Equipment Checklists	App. F

South Dakota Codified Laws – 34A-12-9, 34A-18-2, 34A-18-9

South Dakota Codified Laws – 34A-12-9, 34A-18-2, 34A-18-9		
34A-12-9	**Brief Description**	**Location in Plan**
34A-12-9	Report of discharge--Rules for reporting. Any person who has caused a discharge of a regulated substance shall immediately report the discharge to the department. The department may promulgate rules pursuant to chapter 1-26 to provide for the procedures to be followed in reporting a discharge.	2.0, Fig. 2.3
34A-18-2	**Brief Description**	**Location in Plan**
34A-18-2	Oil spill response plan required. Each crude oil pipeline operator which is issued a permit from the South Dakota Public Utilities Commission under the Energy Conversion and Transmission Facilities Act shall prepare an oil spill response plan. An oil spill response plan must plan for resources for responding, to the maximum extent practicable, to a worst case discharge, and to a substantial threat of such a discharge. Each response plan must include, but not be limited to:	-----
(1)	Immediate notification procedures;	2.0
(2)	Spill detection and mitigation procedures;	3.0, App. C
(3)	The name, address, and telephone number of the oil spill response organization, if appropriate;	2.0
(4)	Response activities and response resources;	App. A
(5)	Names and telephones of federal, state, and local agencies which the operator expects to have pollution control responsibilities or support;	2.0
(6)	Training procedures;	App. D
(7)	Equipment testing;	App. D.2
(8)	Drill types, schedules, and procedures; and	App. D
(9)	Plan review and update procedures.	1.4
	No oil spill response plan is effective until it is approved by the department.	-----
34A-18-9	**Brief Description**	**Location in Plan**
34A-18-9	Reports regarding spill. Each crude oil pipeline operator that experiences a spill shall file a written report with the department, within thirty days of discovery of the spill, if the spill: • Is of five gallons or more; or • Causes an explosion or fire; or • Causes the injury or death of any person.	2.0

Glossary of Terms and Acronyms

Glossary of Terms

Activate: The process of mobilizing personnel and/or equipment within the response organization to engage in response operations.

Activator: An individual in the response organization whose responsibilities include notifying other individuals or groups within the organization to mobilize personnel and/or equipment.

Adverse Weather: The weather conditions that will be considered when identifying response systems and equipment in a response plan for the applicable operating environment. Factors to consider include significant wave height, ice, temperature, weather - related visibility, and currents within the Captain of the Port (COTP) zone in which the systems or equipment are intended to function.

Agency Representative: Individual assigned to an incident from an agency who has been delegated full authority to make decisions on all matters affecting that agency's participation in response operations.

Area Committee: As defined by Sections 311(a)(18) and (j)(4) of CWA, as amended by OPA, means the entity appointed by the President consisting of members from Federal, State, and local agencies with responsibilities that include preparing an Area Contingency Plan for the area designated by the President. The Area Committee may include ex-officio (i.e., non-voting) members (e.g., industry and local interest groups).

Area Contingency Plan: As defined by Sections 311(a)(19) and (j)(4) of CWA, as amended by OPA, means the plan prepared by an Area Committee, that in conjunction with the NCP, shall aliress the removal of a discharge including a worst-case discharge and the mitigation or prevention of a substantial threat of such a discharge from a vessel, offshore facility, or onshore facility operating in or near an area designated by the President.

Average Most Probable Discharge: A discharge of the lesser of 50 barrels or 1% of the volume of the worst case discharge.

Barrel (bbl): Measure of space occupied by 42 U.S. gallons at 60 degrees Fahrenheit.

Bioremediation Agents: Means microbiological cultures, enzyme aliitives, or nutrient aliitives that are deliberately introduced into an oil discharge and that will significantly increase the rate of biodegradation to mitigate the effects of the discharge.

Boom: A piece of equipment or a strategy used to either contain free floating oil to a confined area or protect an uncontaminated area from intrusion by oil.

Booming Strategies: Strategic techniques which identify the location and quantity of boom required to protect certain areas. These techniques are generated by identifying a potential spill source and assuming certain conditions which would affect spill movement on water.

Bulk: Material that is stored or transported in a loose, unpackaged liquid, powder, or granular form capable of being conveyed by a pipe, bucket, chute, or belt system.

Chemical Agents: Means those elements, compounds, or mixtures that coagulate, disperse, dissolve, emulsify, foam, neutralize, precipitate, reduce, solubilize, oxidize, concentrate, congeal, entrap, fix, make the pollutant mass more rigid or viscous, or otherwise facilitate the mitigation of deleterious effects or the removal of the oil pollutant from the water. Chemical agents include biological alternatives, dispersants, sinking agents, miscellaneous oil spill control agents, and burning agents, but do not include solvents.

Clean-up Contractor: Persons contracted to undertake a response action to clean up a spill.

Cleanup: For the purposes of this document, cleanup refers to the removal and/or treatment of oil, hazardous substances, and/or the waste or contaminated materials generated by the incident. Cleanup includes restoration of the site and its natural resources.

Coastal Waters: For the purpose of classifying the size of discharges, means the waters of the coastal zone except for the Great Lakes and specified ports and harbors on inland rivers.

Coastal Zone: As defined for the purpose of the NCP, means all United States waters subject to the tide, United States waters of the Great Lakes, specified ports and harbors on inland rivers, waters of the contiguous zone, other waters of the high seas subject to the NCP, and the land surface or land substrata, ground waters, and ambient air proximal to those waters. The term coastal zone delineates an area of federal responsibility for response action. Precise boundaries are determined by EPA/USCG agreements and identified in federal regional contingency plans.

Coast Guard District Response Ground (DRG): As provided for by CWA sections 311(a)(20) and (j)(3), means the entity established by the Secretary of the department in which the USCG is operating within each USCG district and shall consist of: the combined USCG personnel and equipment, including firefighting equipment, of each port within the district; additional prepositioned response equipment; and a district response advisory team.

Command: The act of controlling manpower and equipment resources by virtue of explicit or delegated authority.

Command Post: A site located at a safe distance from the spill site where response decisions are made, equipment and manpower deployed, and communications handled. The Incident Commander and the On-Scene Coordinators may direct the on-scene response from this location.
Communications Equipment: Equipment that will be utilized during response operations to maintain communication between the Company employees, contractors, Federal/State/Local agencies. (Radio/ telephone equipment and links)

Containment Boom: A flotation/freeboard device, made with a skirt/curtain, longitudinal strength member, and ballast unit/weight designed to entrap and contain the product for recovery.

Contingency Plan: A document used by (1) federal, state, and local agencies to guide their planning and response procedures regarding spills of oil, hazardous substances, or other emergencies; (2) a document used by industry as a response plan to spills of oil, hazardous substances, or other emergencies occurring upon their vessels or at their facilities.

Contract or Other Approved Means: For OPA 90, a written contract with a response contractor; certification by the facility owner or operator that personnel and equipment are owned, operated, or under the direct control of the facility, and available within the stipulated times; active membership in a local or regional oil spill removal organization; and/or the facility's own equipment.

Critical Areas to Monitor: Areas which if impacted by spilled oil may result in threats to public safety or health.

Cultural Resources: Current, historic, prehistoric and archaeological resources which include deposits, structures, ruins, sites, buildings, graves, artifacts, fossils, or other objects of antiquity which provide information pertaining to the historical or prehistorical culture of people in the state as well as to the natural history of the state.

Damage Assessment: The process of determining and measuring damages and injury to the human environment and natural resources, including cultural resources. Damages include differences between the conditions and use of natural resources and the human environment that would have occurred without the incident, and the conditions and use that ensued following the incident. Damage assessment includes planning for restoration and determining the costs of restoration.

Decontamination: The removal of hazardous substances from personnel and their equipment necessary to prevent adverse health effects.
Discharge: Any spilling, leaking, pumping, pouring, emitting, emptying, or dumping.

Dispersants: Means those chemical agents that emulsify, disperse, or solubilize oil into the water column or promote the surface spreading of oil slicks to facilitate dispersal of the oil into the water column.

Diversion Boom: A floatation/freeboard device, made with a skirt/curtain, longitudinal strength member, and ballast unit/weight designed to deflect or divert the product towards a pickup point, or away from certain areas.

Drinking Water Supply: As defined by Section 101(7) of CERCLA, means any raw or finished water source that is or may be used by a public water system (as defined in the Safe Drinking Water Act) or as drinking water by one or more individuals.

EM: Emergency Management. Serves as the focal point for senior management support of an incident.

Economically Sensitive Areas: Those areas of explicit economic importance to the public that due to their proximity to potential spill sources may require special protection and include but are not limited to: potable and industrial water intakes; locks and dams; and public and private marinas.

Emergency: An unforeseen or imminent event which requires prompt coordination of resources, special communications and/or heightened authority for employees to protect the health, safety or welfare of people first, and then to limit damage to property, the environment or company operations.
Emergency Management: The personnel identified to staff the organizational structure identified in a response plan to manage response plan implementation.

Emergency Service: Those activities provided by state and local government to prepare for and carry out any activity to prevent, minimize, respond to, or recover from an emergency.

Environmentally Sensitive Areas: Streams and water bodies, aquifer recharge zones, springs, wetlands, agricultural areas, bird rookeries, endangered or threatened species (flora and fauna) habitat, wildlife preserves, or conservation areas, parks, beaches, dunes, or other areas protected or managed for its natural resource value.

Facility: Either an onshore facility or an offshore facility and includes, but is not limited to structures, equipment, and appurtenances thereto, used or capable of being used to transfer oil to or from a vessel or a public vessel. A facility includes federal, state, municipal, and private facilities.

Facility Operator: The person who owns, operates, or is responsible for the operation of the facility.

Federal Fund: The spill liability trust fund established under OPA.

Federal Regional Response Team: The federal response organization (consisting of representatives from selected federal and state agencies) which acts as a regional body responsible for planning and preparedness before an oil spill occurs and providing advice to the FOSC in the event of a major or substantial spill.

Federal Response Plan (FRP): Means the agreement signed by 25 federal departments and agencies in April 1987 and developed under the authorities of the Earthquake Hazards Reduction Act of 1977 and the Disaster Relief Act of 1974, as amended by the Stafford Disaster Relief Act of 1988.

First Responders, First Response Agency: A public health or safety agency (e.g., fire service or police department) charged with responding to a spill during the emergency phase and alleviating immediate danger to human life, health, safety, or property.

Handle Product: To transfer, transport, pump, treat, process, store, dispose of, drill for, or produce.

Harmful Quantity Of Oil: The presence of oil from an unauthorized discharge in a quantity sufficient either to create a visible film or sheen upon or discoloration of the surface of the water or a shoreline, tidal flat, beach, or marsh, or to cause a sludge or emulsion to be deposited beneath the surface of the water or on a shoreline, tidal flat, beach, or marsh.

Hazardous Material: Any nonradioactive solid, liquid, or gaseous substance which, when uncontrolled, may be harmful to humans, animals, or the environment. Including but not limited to substances

otherwise defined as hazardous wastes, dangerous wastes, extremely hazardous wastes, oil, or pollutants.

Hazardous Substance: Any substance designed as such by the Administrator of the EPA pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act; regulated pursuant to Section 311 of the Federal Water Pollution Control Act or discharged by the SERC.

Hazardous Waste: Any solid waste identified or listed as a hazardous waste by the Administrator of the EPA pursuant to the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), 42 U.S.C., Section 6901, et seq as amended. The EPA Administrator has identified the characteristics of hazardous wastes and listed certain wastes as hazardous in Title 40 of the Code of Federal Regulations, Part 261, Subparts C and D respectively.

HAZMAT: Hazardous materials or hazardous substances, exposure to which may result in adverse effects on health or safety of employees.

HAZWOPER: Hazardous Waste Operations and Emergency Response Regulations published by OSHA to cover worker safety and health aspects of response operations.

Heat Stress: Dangerous physical condition caused by over exposure to extremely high temperatures.

Hypothermia: Dangerous physical condition caused by over exposure to freezing temperatures.
Incident: Any event that results in a spill or release of oil or hazardous materials. Action by emergency service personnel may be required to prevent or minimize loss of life or damage to property and/or natural resources.

Incident Briefing Meeting: Held to develop a comprehensive, accurate, and up-to-date understanding of the incident, nature of status of control operations, and nature and status of response operations; ensure the adequacy of control and response operations; begin to organize control and response operations; and prepare for interactions with outside world.

Incident Command Post (ICP): That location at which all primary command functions are executed.

Incident Command System (ICS): The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, with responsibility for the management of assigned resources at an incident.

Incident Commander (IC): The one individual in charge at any given time of an incident. The Incident Commander will be responsible for establishing a unified command with all on-scene coordinators.

Indian Tribe: As defined in OPA section 1001, means any Indian tribe, band, nation, or other organized group or community, but not including any Alaska Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians and has governmental authority over lands belonging to or controlled by the Tribe.

Initial Cleanup: Remedial action at a site to eliminate acute hazards associated with a spill. An initial clean-up action is implemented at a site when a spill of material is an actual or potentially imminent threat to public health or the environment, or difficulty of cleanup increases significantly without timely remedial action. All sites must be evaluated to determine whether initial cleanup is total cleanup, however, this will not be possible in all cases due to site conditions (i.e., a site where overland transport or flooding may occur).

Initial Notification: The process of notifying necessary the Company personnel and Federal/ State/Local agencies that a spill has occurred, including all pertinent available information surrounding the incident.

Initial Response Actions: The immediate actions that are to be taken by the spill observer after detection of a spill.

Inland Area: The area shoreward of the boundary lines defined in 46 CFR part 7, except that in the Gulf of Mexico, it means the area shoreward of the lines of demarcation (COLREG lines) as defined in §80.740 through 80.850 of this chapter. The inland area does not include the Great Lakes.
Inland Waters: State waters not considered coastal waters; lakes, rivers, ponds, streams, underground water, et. al.

Inland Zone: Means the environment inland of the coastal zone excluding the Great Lakes, and specified ports and harbors on inland rivers. The term inland zone delineates an area of federal responsibility for response action. Precise boundaries are determined by EPA/USCG agreements and identified in federal regional contingency plans.

Interim Storage Site: A site used to temporarily store recovered oil or oily waste until the recovered oil or oily waste is disposed of at a permanent disposal site. Interim storage sites include trucks, barges, and other vehicles, used to store waste until the transport begins.

Lead Agency: The government agency that assumes the lead for directing response activities.

Lead Federal Agency: The agency which coordinates the federal response to incident on navigable waters. The lead federal agencies are:

- U.S. Coast Guard: Oil and chemically hazardous materials incidents on navigable waters.
- Environmental Protection Agency: Oil and chemically hazardous materials incidents on inland waters.

Lead State Agency: The agency which coordinates state support to federal and/or local governments or assumes the lead in the absence of federal response.

Loading: Transfer from Facility to vehicle.

Local Emergency Planning Committee (LEPC): A group of local representatives appointed by the State Emergency Response Commission (SERC) to prepare a comprehensive emergency plan for the local

emergency planning district, as required by the Emergency Planning and Community Right-to-know Act (EPCRA).

Local Response Team: Designated Facility individuals who will fulfill the roles determined in the oil spill response plan in the event of an oil or hazardous substance spill. They will supervise and control all response and clean-up operations.

Lower Explosive Limit: Air measurement utilized to determine the lowest concentration of vapors that support combustion. This measurement must be made prior to entry into a spill area or a confined space.

Marinas: Small harbors with docks, services, etc. for pleasure craft.

Medium Discharge: Means a discharge greater than 2,100 gallons (50 Bbls) and less than or equal to 36,000 gallons (85+ Bbls) or 10% of the capacity of the largest tank, whichever is less and not to exceed the WCD.

National Contingency Plan: The plan prepared under the Federal Water Pollution Control Act (33 United State Code §1321 et seq) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 United State Code § 9601 et seq), as revised from time to time.

National Pollution Funds Center (NPFC): Means the entity established by the Secretary of Transportation whose function is the administration of the Oil Spill Liability Trust Fund (OSLTF). Among the NPFC's duties are: providing appropriate access to the OSLTF for federal agencies and states for removal actions and for federal trustees to initiate the assessment of natural resource damages; providing appropriate access to the OSLTF for claims; and coordinating cost recovery efforts.

National Response System (NRS): Is the mechanism for coordinating response actions by all levels of government in support of the OSC. The NRS is composed of the NRT, RRTs, OSC, Area Committees, and Special Teams and related support entities.

National Strike Force (NSF): Is a special team established by the USCG, including the three USCG Strike Teams, the Public Information Assist Team (PIAT), and the National Strike Force Coordination Center. The NSF is available to assist OSCs in their preparedness and response duties.

National Strike Force Coordination Center (NSFCC): Authorized as the National Response Unit by CWA section 311(a)(23) and (j)(2), means the entity established by the Secretary of the department in which the USCG is operating at Elizabeth City, North Carolina, with responsibilities that include administration of the USCG Strike Teams, maintenance of response equipment inventories and logistic networks, and conducting a national exercise program.

Natural Resource: Land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to or otherwise controlled by the state, federal government, private parties, or a municipality.

Navigable Waters: As defined by 40 CFR 110.1 means the waters of the United States, including the territorial seas. The term includes:

- All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; Interstate waters, including interstate wetlands;
- All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, and wetlands, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
    - that are or could be used by interstate or foreign travelers for recreational or other purposes;
    - from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; and
    - that are used or could be used for industrial purposes by industries in interstate commerce.
- All impoundments of waters otherwise defined as navigable waters under this section;
    - Tributaries of waters identified in paragraphs (a) through (d) of this definition, including adjacent wetlands; and
    - Wetlands adjacent to waters identified in paragraphs (a) through (e) of this definition: Provided, that waste treatment systems (other than cooling ponds meeting the criteria of this paragraph) are not waters of the United States.
    - Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act jurisdiction remains with EPA.

Nearshore Area: For OPA 90, the area extending seaward 12 miles from the boundary lines defined in 46 CFR Part 7, except in the Gulf of Mexico. In the Gulf of Mexico, it means the area extending seaward 12 miles from the line of demarcation defined in §80.740 - 80.850 of title 33 of the CFR.

Non-persistent or Group I Oil: A petroleum-based oil that, at the time of shipment, consists of hydrocarbon fractions:

- At least 50% of which by volume, distill at a temperature of 340 degrees C (645 degrees F);
- At least 95% of which volume, distill at a temperature of 370 degrees C (700 degrees F).

Ocean: The open ocean, offshore area, and nearshore area as defined in this subpart.

Offshore area: The area up to 38 nautical miles seaward of the outer boundary of the nearshore area. Liquids Pipelines Control Center: LPCC Responsible for 24/7 Remote Monitoring and Control of Oil Pipelines Facilities.

Oil or Oils: Naturally occurring liquid hydrocarbons at atmospheric temperature and pressure coming from the earth, including condensate and natural gasoline, and any fractionation thereof, including, but not limited to, crude oil, petroleum gasoline, fuel oil, diesel oil, oil sludge, oil refuse, and oil mixed with wastes other than dredged spoil. Oil does not include any substance listed in Table 302.4 of 40 CFR Part 302 adopted August 14, 1989, under Section 101(14) of the federal comprehensive environmental response, compensation, and liability act of 1980, as amended by P. L. 99-499.

Oil Spill Liability Trust Fund: Means the fund established under section 9509 of the Internal Revenue Code of 1986 (26 U.S.C. 9509).

Oily Waste: Product contaminated waste resulting from a spill or spill response operations.

On-Scene Coordinator (OSC): Means the federal official predesignated by the EPA or the USCG to coordinate and direct response under subpart D.

On-site: Means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of a response action.

Open Ocean: means the area from 38 nautical miles seaward of the outer boundary of the nearshore area, to the seaward boundary of the exclusive economic zone.

Owner or Operator: Any person, individual, partnership, corporation, association, governmental unit, or public or private organization of any character.

Persistent Oil: A petroleum-based oil that does not meet the distillation criteria for a non-persistent oil. For the purposes of this Appendix, persistent oils are further classified based on specific gravity as follows:

- Group II specific gravity less than .85
- Group III specific gravity between .85 and less than .95
- Group IV specific gravity .95 and including 1.0
- Group V specific gravity greater than 1.0

Plan Holder: The plan holder is the industry transportation related facility for which a response plan is required by federal regulation to be submitted by a vessel or facility's owner or operator.

Post Emergency Response: The portion of a response performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the sites has begun.

Post Emergency: The phase of response operations conducted after the immediate threat of the release has been stabilized, and cleanup operations have begun.

Primary Response Contractors or Contractors: An individual, company, or cooperative that has contracted directly with the plan holder to provide equipment and/or personnel for the containment or cleanup of spilled oil.

Qualified Individual (QI): That person or entity who has authority to activate a spill cleanup contractors, act as liaison with the "On-Scene Coordinator" and obligate funds required to effectuate response activities.

Recreation Areas: Publicly accessible locations where social/sporting events take place.

Regional Response Team (RRT): The Federal response organization (consisting of representatives from selected Federal and State agencies) which acts as a regional body responsible for overall planning and preparedness for oil and hazardous materials releases and for providing advice to the OSC in the event of a major or substantial spill.

Remove or Removal: As defined by section 311(a)(8) of the CWA, refers to containment and removal of oil or hazardous substances from the water and shorelines or the taking of such other actions as may be necessary to minimize or mitigate damage to the public health or welfare (including, but not limited to, fish, shellfish, wildlife, public and private property, and shorelines and beaches) or to the environment. For the purpose of the NCP, the term also includes monitoring of action to remove discharge.

Response Activities: The containment and removal of oil from the water and shorelines, the temporary storage and disposal of recovered oil, or the taking of other actions as necessary to minimize or mitigate damage to public health or welfare, or the environment.

Response Contractors: Persons/companies contracted to undertake a response action to contain and/or clean up a spill.

Response Guidelines: Guidelines for initial response that are based on the type of product involved in the spill, these guidelines are utilized to determine clean-up methods and equipment.

Response Plan: A practical manual used by industry for responding to a spill. Its features include: (1) identifying the notifications sequence, responsibilities, response techniques, etc. in an easy to use format; (2) using decision trees, flowcharts, and checklists to insure the proper response for spills with varying characteristics; and (3) segregating information needed during the response from data required by regulatory agencies to prevent confusion during a spill incident.

Response Resources: All personnel and major items of equipment available, or potentially available, for assignment to incident tasks on which status is maintained.

Responsible Party: Any person, owner/operator, or facility that has control over an oil or hazardous substance immediately before entry of the oil or hazardous substance into the atmosphere or in or upon the water, surface, or subsurface land of the state.

Response Priorities: Mechanism used to maximize the effective use of manpower and equipment resources based upon their availability during an operational period.

Response Resources: All personnel and major items of equipment available, or potentially available, for assignment to incident tasks on which status is maintained.

Restoration: The actions involved in returning a site to its former condition.

Rivers and Canals: A body of water confined within the inland area that has a project depth of 12 feet or less, including the Intracoastal Waterway and other waterways artificially created for navigation.

Securing the Source: Steps that must be taken to stop discharge of oil at the source of the spill.

Sinking Agents: Means those alternatives applied to oil discharges to sink floating pollutants below the water surface.

Site Characterization: An evaluation of a cleanup site to determine the appropriate safety and health procedures needed to protect employees from identified hazards.

Site Conditions: Details of the area surrounding the facility, including shoreline descriptions, typical weather conditions, socioeconomic breakdowns, etc.

Site Safety and Health Plan: A site specific plan developed at the time of an incident that addresses:

- Safety and health hazard analysis for each operation.
- Personal protective equipment to be used.
- Training requirements for site workers.
- Medical surveillance requirements.
- Air monitoring requirements.
- Site control measures.
- Decontamination procedures.
- Emergency response procedures.
- Confined space entry procedures.

Site Security and Control: Steps that must be taken to provide safeguards needed to protect personnel and property, as well as the general public, to ensure an efficient clean-up operation.

Skimmers: Mechanical devices used to skim the surface of the water and recover floating oil. Skimmers fall into four basic categories (suction heads, floating weirs, oleophilic surface units, and hydrodynamic devices) which vary in efficiency depending on the type of oil and size of spill.

Snare Boom: Oil will adhere to the material of which this boom is made of and thus collect it.

Sorbents: Materials ranging from natural products to synthetic polymeric foams placed in confined areas to soak up small quantities of oil. Sorbents are very effective in protecting walkways, boat decks, working areas, and previously uncontaminated or cleaned areas.

Spill: An unauthorized discharge of oil or hazardous substance into the waters of the state.

Spill Observer: The first Facility individual who discovers a spill. This individual must function as the first responder and person-in-charge until relieved by an authorized supervisor.

Spill of National Significance (SONS): Means a spill which due to its severity, size, location, actual or potential impact on the public health and welfare or the environment, or the necessary response effort, is so complex that it requires extraordinary coordination of federal, state, local, and responsible party resources to contain and cleanup the discharge.

Spill Management Team: The personnel identified to staff the organizational structure identified in a response plan to manage response plan implementation.

Spill Response: All actions taken in responding to spills of oil and hazardous materials, e.g.: receiving and making notifications; information gathering and technical advisory phone calls; preparation for and travel to and from spill sites; direction of clean-up activities; damage assessments; report writing, enforcement investigations and actions; cost recovery; and program development.

Spill Response Personnel: Federal, state, local agency, and industry personnel responsible for participating in or otherwise involved in spill response. All spill response personnel will be pre-approved on a list maintained in each region.

Staging Areas: Designated areas near the spill site accessible for gathering and deploying equipment and/or personnel.

State Emergency Response Commission (SERC): A group of officials appointed by the Governor to implement the provisions of Title III of the Federal Superfund Amendments and Re-authorization Act of 1986 (SARA). The SERC approves the State Oil and Hazardous Substance Discharge Prevention and Contingency Plan and Local Emergency Response Plans.

Surface Collecting Agents: Means those chemical agents that form a surface film to control the layer thickness of oil.

Surface Washing Agent: Is any product that removes oil from solid surfaces, such as beaches and rocks, through a detergency mechanism and does not involve dispersing or solubilizing the oil into the water column.

Tanker: A self-propelled tank vessel constructed or adapted primarily to carry or hazardous material in bulk in the cargo spaces.

Tidal Current Tables: Tables which contain the predicted times and heights of the high and low waters for each day of the year for designated areas.

Trajectory Analysis: Estimates made concerning spill size, location, and movement through aerial surveillance or computer models.

Transfer: Any movement of oil to, from, or within a vessel by means of pumping, gravitation, or displacement.

Trustee: Means an official of a federal natural resources management agency designated in subpart G of the NCP or a designated state official or Indian tribe or, in the case of discharges covered by the OPA, a foreign government official, who may pursue claims for damages under section 1006 of the OPA.

Underwriter: An insurer, a surety company, a guarantor, or any other person, other than an owner or operator of a vessel or facility, that undertakes to pay all or part of the liability of an owner or operator.

Unified Command: The method by which local, state, and federal agencies and the responsible party will work with the Incident Commander to:

- Determine their roles and responsibilities for a given incident.
- Determine their overall objectives for management of an incident.
- Select a strategy to achieve agreed-upon objectives.
- Deploy resources to achieve agreed-upon objectives.

Unified or Coordinated Command Meeting: Held to obtain agreement on strategic objectives and response priorities; review tactical strategies; engage in joint planning, integrate response operations; maximize use of resources; and minimize resolve conflicts.

Volunteers: An individual who donates their services or time without receiving monetary compensation.

Waste: Oil or contaminated soil, debris, and other substances removed from coastal waters and adjacent waters, shorelines, estuaries, tidal flats, beaches, or marshes in response to an unauthorized discharge. Waste means any solid, liquid, or other material intended to be disposed of or discarded and generated as a result of an unauthorized discharge of oil. Waste does not include substances intended to be recycled if they are in fact recycled within 90 days of their generation or if they are brought to a recycling facility within that time.

Waters of the United States: See Navigable Waters in this Glossary.

Wetlands: Those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include playa lakes, swamps, marshes, bogs, and similar areas such as sloughs, prairie potholes, wet meadows, prairie river overflows, mudflats, and natural ponds (40 CFR 112.2(y)).

Wildlife Rescue: Efforts made in conjunction with Federal and State agencies to retrieve, clean, and rehabilitate birds and wildlife affected by an oil spill.

Worst Case Discharge: The largest foreseeable discharge under adverse weather conditions. For facilities located above the high water line of coastal waters, a worst case discharge includes those weather conditions most likely to cause oil discharged from the facility to enter coastal waters.

Acronyms

AMIO - Alien Migration Interdiction Operation
AQI - Alternate Qualified Individual
AM - Ante Meridiem
ACP - Area Contingency Plan
Avg. - Average
Bbls - Barrels
bbl/hr - Barrel per Hour
Br - Branch
BLM - Bureau of Land Management
COTP - Captain of the Port
Ctr. - Center
CAS Number - Chemical Abstracts Service
CST - Civil Support Team
CG - Coast Guard
CFR - Code of Federal Regulations
Cont'd - Continued
CERT - Corporate Emergency Response Team
CMT - Crisis Management Team
DOA - Dead on Arrival
Dept. - Department
DOD - Department of Defense
DENR - Department of Environment and Natural Resources
DHS - Department of Homeland Security
DOI - Department of Interior
DNR - Department of Natural Resources
DOT - Department of Transportation
D.C. - District of Columbia
Div. - Division
DOCL - Documentation Unit Leader
EM - Emergency Manager
EMS - Emergency Management System
EMS - Emergency Medical Service
EOC - Emergency Operations Center
ERP - Emergency Response Plan
ERT - Emergency Response Team
ESA - Endangered Species Act
EET - Environmental Emergency Team
EPA - Environmental Protection Agency
EDRC - Estimated Daily Recovery Capability
EPA - Environmental Protection Agency
ETA - Estimated Time of Arrival
etc. - Et Cetera
exempli gratia e.g. - For Example
FAA - Federal Aviation Administration
FBI - Federal Bureau of Investigation
FOSC - Federal On-Scene Coordinator
Ft. - Feet
Ft./Sec. - Feet/Second
FIR - Field Investigation Report
FR - Fire Retardant
FWD - Forward
Freq. - Frequency
GRP - Group
Gru Sups. - Group Supervisors
HAZMAT - Hazardous Material
HAZWOPER - Hazardous Waste Operations and Emergency Response Standard
HVAC - Heating, Ventilating, and Air Conditioning
HEPA OVV - High Efficiency Particle Air Device
HF ERW - High Frequency Electric-Resistance Weld
HLS - Homeland Security
Hrs. - Hours
ID NO. - Identification Number
IL - Illinois
IDNR - Illinois Department of Natural Resources
IAW - In Accordance With
IAP - Incident Action Plan
ICP - Incident Command Post
ICS - Incident Command System
IC - Incident Commander
IMH - Incident Management Handbook
IMS - Incident Management System
Info. - Information
IRT - Initial Response Team
KS - Kansas
KM - Kilometer
KP - Kilometer Point
LE - Law Enforcement
LDS - Leak Detection System
LO - Liaison Officer
LPG - Liquefied Petroleum Gas
LEPC - Local Emergency Planning Committee
LRT - Local Response Team

LSC - Logistics Section Chief
LF ERW - Low Frequency Electric-Resistance Weld
LEL - Lower Explosive Limit
MO - Missouri
MSDS - Material Safety Data Sheets
MEDEVAC'D - Medical Evacuation
NCP - National Contingency Plan
NE - Nebraska
NEECP (CA) - National Environmental Emergencies Contingency Plan
NFPA - National Fire Protection Association
NIMS - National Incident Management System
NOAA - National Oceanographic Atmospheric Administration
NCP (U.S.) - National Oil and Hazardous Substances Contingency Plan
NPFC - National Pollution Fund Center
NRC - National Response Center
NRS - National Response System
NSF - National Strike Force
NSFCC - National Strike Force Coordination Center
NRDAR - Natural Resource Damage Assessment and Restoration
CER - Canada Energy Regulator
N - No
ND - North Dakota
NW - North West
N/A - Not Available
OSHA - Occupational Safety & Health Administration
OPA - Oil Pollution Act of 1990
OSRO - Oil Spill Removal Organization
OSRP - Oil Spill Response Plan
OSRV - Oil Spill Response Vessel
OSC - On-Scene Commander
OSC - On-Scene Coordinate
OSC - Operation Section Chief
O&M - Operations and Maintenance
OP - Operational Period
Op. - Operations
OPS - Operations
O&M - Operations and Maintenance
OCC - Operations Coordination Center
OV - Organic Vapor
PPM - Parts Per Million
PFD - Personal Floatation Device
PPE - Personal Protection Equipment
PHMSA - Pipeline and Hazardous Materials Safety Administration
PSC - Planning Section Chief
POC - Point of Contact
PVC - Polyvinyl Chloride
P.M. - Post Meridiem
PREP - Preparedness for Response Exercise Program
Prot. - Protection
PWSD - Public Water Supply District
QI - Qualified Individual
REET - Regional Environmental Emergency Team
RPT - Regional Preparedness Team
RRT - Regional Response Team
Req. - Required
RCRA - Resource Conservation and Recovery Act
RESL - Resource Leader
RP - Responsible Party
RPIC - Responsible Party Incident Commander
Rev. - Revision
ROW - Right-of-Way
RWD - Rural Water District
SAR - Search and Rescue
SART - Search and Rescue Transporter
Sec. - Second
SI - Security Incident
SO - Security Officer
SCBA - Self-Contained Breathing Apparatus
SSPs - Site Safety Plans
SITL - Situation Unit Leader
SD - South Dakota
Spec. - Special
SONS - Spill of National Significance
SPCC - Spill Prevention, Control, and Countermeasure
SORS - Spilled oil Recovery System
Sq. Ft. - Square Foot
STAM - Staging Area Manager
SERC - State Emergency Response Center

SERC - State Emergency Response Commission
SOSC - State On-Scene Coordinator
SOR - Statutory Orders and Regulations
SUPSALV - US Navy Supervisor Salvage & Diving
SCADA - Supervisory Control and Data Acquisition
TOC - Table of Contents
TSD - Temporary Storage and Disposal
TSC - Temporary Storage Capacity
id est, I.E. - That is
TBA - To be Assigned
TSB - Transportation Safety Board
UC - Unified Command
UN Number - United Nations
US - United States
USCG - United States Coast Guard
Vsl. - Vessel
VOSS - Vessel of Opportunity Skimmer System
VP - Vice President
VOC - Volatile Organic Compound
Vol. - Volume
W - West
WCD - Worst Case Discharge
Y - Yes

Response Zone 1: Hardisty Tank Terminal

Response Zone Contact Information	
Owner Name:	TC Energy
Addresses:	(Physical Address)
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.
Provinces/States Traversed:	Alberta
Areas/Counties Traversed:	Eastern Alberta

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because at least one (1) line section within the response zone has met at least one of the criteria listed in 49CFR194.103(c)(1).

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	Bbls

Hardisty Tank Terminal is located at the north end of the Hardisty hub of oil storage tanks also known as the Hardisty Complex. The image below shows the entire Hardisty Complex. Other companies operating facilities here include Enbridge, Husky Energy, Gibson Energy, Inter Pipeline, CNRL, Plains Midstream, Tervita and Kinder Morgan Canada.

TC Energy's Hardisty Terminal is the northern-most terminal within Hardisty Complex, and it is the largest operation north of Highway 13 in the immediate area.

Company Contact References for the following Canadian Response Zones: • Hardisty Tank Terminal • Haridsty Pump Station/Regina Pump Station • Regina Pump Station/Haskett Pump Station				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Leadership for the following Response Zones: • Hardisty Terminal • Hardisty Pump Station/Regina Pump Station				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director – Canadian Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cypress Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Hardisty Area Manger	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 1: Pipeline Specifications			
Location	**Type of Oil**	**State/Province**	**County/Description**
This Response Zone only includes Breakout Tanks at Hardisty Terminal. This Response Zone includes zero (0) miles of pipe and zero (0) pipe segments.			

Response Zone 1: Company Owned Response Equipment	
Equipment Type	**Location**

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Response Zone 1: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
			Crude
			Crude
			Crude
			Crude
			Crude
			Crude

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes tank names/volumes.

Response Zone 1: External Notification References
Alberta
Local Municipal notifications can be observed in the appropriate Tier III Emergency Response Plan within this Response zone.

Response Zone 2: Hardisty Pump Station to Regina Pump Station

Response Zone Contact Information	
Owner Name:	TC Energy
Addresses:	(Physical Address)
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.
Provinces/States Traversed:	Alberta, Saskatchewan
Areas/Counties Traversed:	Eastern Alberta, Western Saskatchewan

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because at least one (1) line section within the response zone has met at least one of the criteria listed in 49CFR194.103(c)(1).

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	


Response Zone Layout Map
Hardisty PS to Regina PS
TransCanada
Fort McMurray
Prince Albert National Park
Prince Albert
Saskatoon
PS-5 Hardisty
PS-6 Lakesend
PS-7 Monitor
PS-8 Oyen
PS-9 Bindloss
PS-10 Liebenthal
PS-11 Cabri
PS-12 Stewart Valley
PS-13 Herbert
PS-14 Chaplin
PS-15 Caron
PS-16 Belle Plaine
PS-17 Regina
Medicine Hat
Grasslands N.P.
Havre
Malta
Fort Peck Indian Reservation
Glasgow
Wolf Point
Great Falls
Lewistown
Glendive
Harlowton
Roundup
Miles City
Forsyth
Billings
Hardin
Legend
Pump Stations
Canadian Segment
MIDSTREAM

Company Contact References for the following Canadian Response Zones:

- Hardisty Tank Terminal
- Haridsty Pump Station/Regina Pump Station
- Regina Pump Station/Haskett Pump Station

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Leadership for the following Response Zones:

- Hardisty Terminal
- Hardisty Pump Station/Regina Pump Station

FNAME	LNAME	TITLE	WORK	CELL
		Director – Canadian Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cypress Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Hardisty Area Manger	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 2: Pipeline Specifications

Location	Type of Oil	State/Province	County/Description
Cabri PS / Herbert PS	Crude Oil	Saskatchewan	Western Saskatchewan
Herbert PS / Caron PS	Crude Oil	Saskatchewan	Western Saskatchewan
Hardisty PS / Lakesend PS	Crude Oil	Alberta	Eastern Alberta
Lakesend PS / Monitor PS	Crude Oil	Alberta	Eastern Alberta
Monitor PS / Oyen PS	Crude Oil	Alberta	Eastern Alberta
Oyen PS / Bindloss PS	Crude Oil	Alberta	Eastern Alberta
Blindloss PS / Cabri PS	Crude Oil	Alberta	Eastern Alberta

Response Zone 2: Company Owned Response Equipment

Equipment Type	Location

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Response Zone 2: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
This Response Zone include zero (0) breakout tanks.			

Response Zone 2: External Notification References
Alberta, Saskatchewan
Local Municipal notifications can be observed in the appropriate Tier III Emergency Response Plan within this Response zone.

Response Zone 3: Regina Pump Station to Haskett Pump Station

Response Zone Contact Information	
Owner Name:	TC Energy
Addresses:	(Physical Address)
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.
Provinces/States Traversed:	Saskatchewan, Manitoba
Areas/Counties Traversed:	Eastern Saskatchewan, Southwestern Manitoba

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because at least one (1) line section within the response zone has met at least one of the criteria listed in 49CFR194.103(c)(1).

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	


Response Zone Layout Map
Regina PS to Haskett PS
TransCanada
Grass River Provincial Park
Lake Winnipeg
Chitek Lake Park Reserve
Riding Mountain N.P.
Lake Manitoba
PS-17 Regina
PS-18 Kendal
PS-19 Grenfell
PS-20 Whitewood
PS-21 Moosomin
PS-22 Crandall
PS-23 Rapid City
PS-24 Wellwood
PS-25 Portage La Prairie
PS-26 Carman
PS-27 Haskett
Brandon
Crosby
Plentywood
Bottineau
Rolla
Langdon
Cando
Rugby
Stanley
Minot
Williston
Devils Lake
Watford City
Sidney
Fort Berthold Indian Agency
Little Missouri National Grassland
Carrington
Washburn
Glendive
Dickinson
Bismarck
Jamestown
Lisbon
Baker
Bowman
Hettinger
Linton
Ellendale
Standing Rock Indian Reservation
Aberdeen
Cheyenne River Indian Agency
Gettysburg
Redfield
Clark
Miller
Huron
Fort Pierre
Lower Brule
Crow Creek
Legend
Pump Stations
Canadian Segment
MIDSTREAM

Company Contact References for the following Canadian Response Zones: • Hardisty Tank Terminal • Haridsty Pump Station/Regina Pump Station • Regina Pump Station/Haskett Pump Station				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Leadership for the following Response Zones: • Regina Pump Station/Haskett Pump Station				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director – Canadian Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cypress Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 3: Pipeline Specifications			
Location	**Type of Oil**	**State/Province**	**County/Description**
Regina PS / Kendal PS	Crude Oil	Saskatchewan	Eastern Saskatchewan
Kendal PS / Grenfell PS	Crude Oil	Saskatchewan	Eastern Saskatchewan
Grenfell PS / Moosomin PS	Crude Oil	Saskatchewan	Eastern Saskatchewan
Moosomin PS / Rapid City PS	Crude Oil	Manitoba	Southwestern Manitoba
Rapid PS / Portage La Prairie PS	Crude Oil	Manitoba	Southwestern Manitoba
Portage La Prairie PS / Carman PS	Crude Oil	Manitoba	Southwestern Manitoba
Carman PS / Haskett PS	Crude Oil	Manitoba	Southwestern Manitoba

Response Zone 3: Company Owned Response Equipment	
Equipment Type	**Location**

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Response Zone 3: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
No Breakout Tanks in this Response Zone			

Response Zone 3: External Notification References
Saskatchewan, Manitoba
Local Municipal notifications can be observed in the appropriate Tier III Emergency Response Plan within this Response zone.

Response Zone 4: North Dakota, South Dakota and Nebraska

Response Zone Contact Information		
Owner Name:	TC Energy	
Addresses:	(Physical Address)	
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)	
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.	
States/Counties Traversed:	North Dakota	Cavalier, Pembina, Walsh, Nelson, Steele, Barnes, Ransom, Sargent
	South Dakota	Marshall, Day, Clark, Beadle, Kingsbury, Miner, Hanson, McCook, Hutchinson, Yankton
	Nebraska (Base)	Cedar, Wayne, Stanton, Platte, Colfax, Butler, Seward, Saline, Jefferson, Gage

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

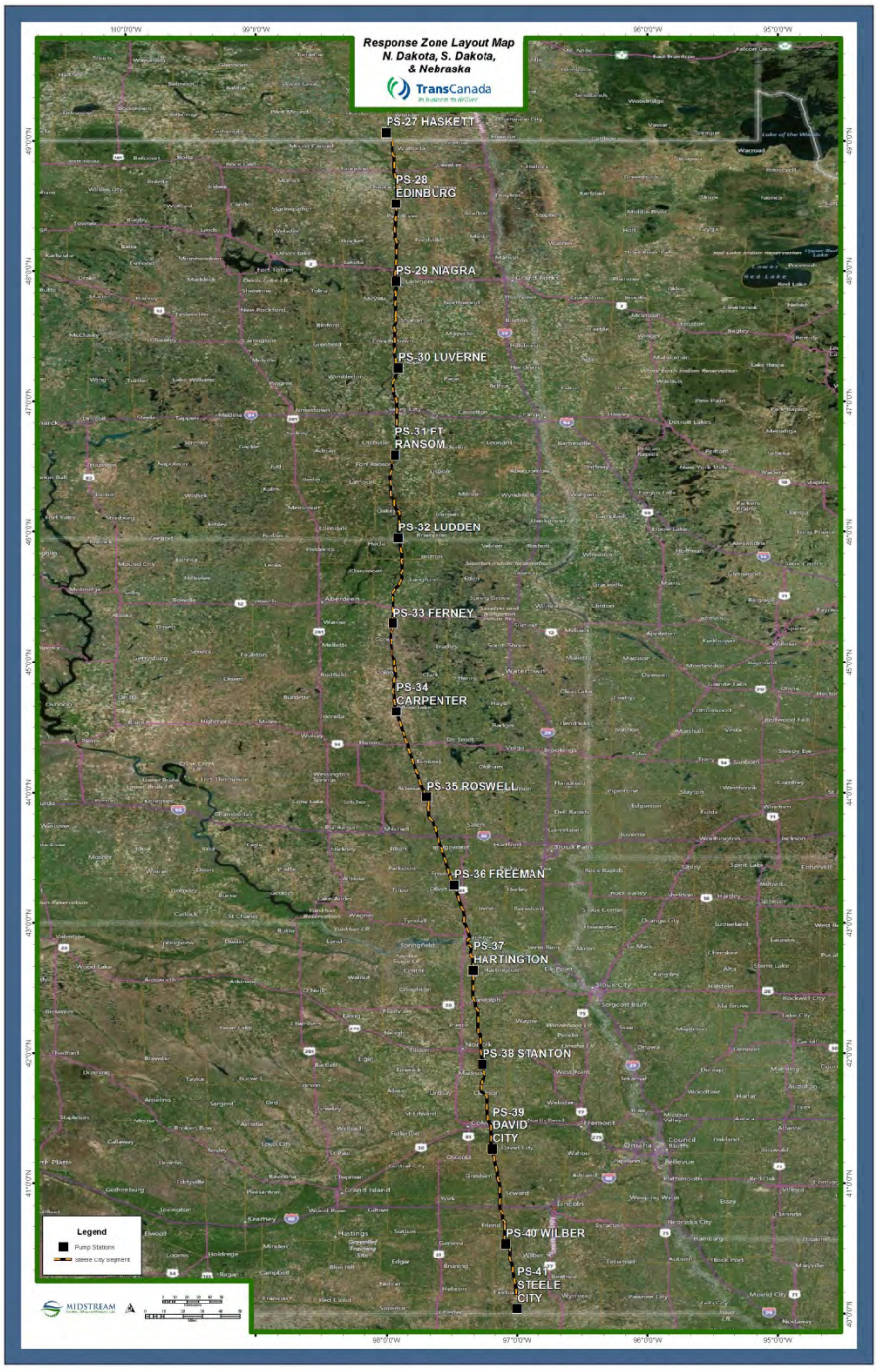
Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because the line section within the response zone has met the following criteria listed in 49CFR194.103(c)(1).

- The pipeline is greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length, and
- The pipeline is located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes, and
- The pipeline is located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas.

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	


Response Zone Layout Map
N. Dakota, S. Dakota,
& Nebraska
TransCanada
PS-27 HASKETT
PS-28 EDINBURG
PS-29 NIAGRA
PS-30 LUVERNE
PS-31 FT RANSOM
PS-32 LUDDEN
PS-33 FERNEY
PS-34 CARPENTER
PS-35 ROSWELL
PS-36 FREEMAN
PS-37 HARTINGTON
PS-38 STANTON
PS-39 DAVID CITY
PS-40 WILBER
PS-41 STEELE CITY
Legend
Pump Stations
Steele City Segment
MIDSTREAM

Company Contact References for the following US Response Zones:

- North Dakota, South Dakota, Nebraska
- Kansas, Missouri, Illinois
- Cushing Extension
- Cushing Tank Terminal
- Gulf Coast
- Houston Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone:

- North Dakota, South Dakota, Nebraska

FNAME	LNAME	TITLE	WORK	CELL
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Glacial Lakes Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Gateway Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 4: Pipeline Specifications

Location	Type of Oil	State	County/Description
US-CAN Border / Edinburg PS	Crude Oil	North Dakota	Cavalier, Pembina, Walsh
Edinburg PS / Niagara PS	Crude Oil	North Dakota	Walsh, Nelson
Niagara PS / Luverne PS	Crude Oil	North Dakota	Nelson, Steele
Luverne PS / Fort Ransom PS	Crude Oil	North Dakota	Steele, Barnes, Ransom
Fort Ransom PS / Ludden PS	Crude Oil	North Dakota	Ransom, Sargent
Ludden PS / Ferney PS	Crude Oil	North Dakota, South Dakota	Sargent, Marshall, Day
Ferney PS / Carpenter PS	Crude Oil	South Dakota	Day, Clark
Carpenter PS / Roswell PS	Crude Oil	South Dakota	Clark, Beadle, Kingsbury, Miner
Roswell PS / Freeman PS	Crude Oil	South Dakota	Miner, Hanson, McCook, Hutchinson
Freeman PS / Hartington PS	Crude Oil	South Dakota, Nebraska	Hutchinson, Yankton, Cedar
Hartington PS / Stanton PS	Crude Oil	Nebraska	Cedar, Wayne, Stanton
Stanton PS / David City PS	Crude Oil	Nebraska	Stanton, Platte, Colfax, Butler
David City PS / Wilber PS	Crude Oil	Nebraska	Butler, Seward, Saline
Wilber PS / Steele City PS	Crude Oil	Nebraska	Saline, Jefferson
Steele City / State Line	Crude Oil	Nebraska	Jefferson, Gage

Response Zone 4: Company Owned Response Equipment

Equipment Type	Equipment ID	Location

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Response Zone 4: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
No Breakout Tanks in this Response Zone			

Response Zone 4: External Notification References		
North Dakota		
Name	**Location**	**Description**
Cavalier County, NE (Langdon)		
County Emergency Mgr.	701-256-3911	Courtesy Reporting
Local Emerg Planning Commission	701-256-2229	TYPE: Any spill or discharge that

		VERBAL: meets or exceeds the Federal Reportable Quantity Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency NOTE: As requested by the Agency
Local Public Safety Answering Point	701-256-2555*	Courtesy Reporting
County Sheriff's Office	701-256-2555*	Courtesy Reporting
Pembina County, NE (Cavalier)		
County Emergency Mgr.	701-265-4849	Courtesy Reporting
Local Emerg Planning Commission	701-265-4849	Courtesy Reporting
Local Public Safety Answering Point	701-265-4122*	Courtesy Reporting
County Sheriff's Office	701-265-4122*	Courtesy Reporting
Walsh County, ND (Grafton)		
County Emergency Mgr.	701-352-2311	Courtesy Reporting
Local Emerg Planning Commission	701-352-2311	Courtesy Reporting
Local Public Safety Answering Point	701-352-2041*	Courtesy Reporting
County Sheriff's Office	701-352-2041*	Courtesy Reporting
Nelson County, ND (Lakota)		
County Emergency Mgr.	701-247-2472	Courtesy Reporting
Local Emerg Planning Commission	701-247-2472	Courtesy Reporting
Local Public Safety Answering Point	701-662-5323	Courtesy Reporting
County Sheriff's Office	701-247-2474*	Courtesy Reporting
Steele County, ND (Finley)		
County Emergency Mgr.	701-270-1738	Courtesy Reporting
Local Emerg Planning Commission	701-270-1738	Courtesy Reporting
Local Public Safety Answering Point	701-524-2742 / 701-636-4510	Courtesy Reporting
County Sheriff's Office	701-524-2742*	Courtesy Reporting
Barnes County, ND (Valley City)		
County Emergency Mgr.	701-845-8510	Courtesy Reporting
Local Emerg Planning Commission	701-845-8510	Courtesy Reporting
Local Public Safety Answering Point	701-845-3110	Courtesy Reporting
County Sheriff's Office	701-845-8530	Courtesy Reporting
Ransom County, ND (Lisbon)		
County Emergency Mgr.	701-683-6125 701-680-0847 (cell)	Courtesy Reporting
Local Emerg Planning Commission	701-683-6125	Courtesy Reporting
Local Public Safety Answering Point	701-328-9921	Courtesy Reporting
County Sheriff's Office	701-683-5255	Courtesy Reporting

Sargent County, ND (Forman)		
County Emergency Mgr.	701-724-6241 ext 113	Courtesy Reporting
Local Emerg Planning Commission	701-724-6241 ext 113	Courtesy Reporting
Local Public Safety Answering Point	800-472-2121	Courtesy Reporting
County Sheriff's Office	701-724-3302	Courtesy Reporting
City of Fargo		
City of Fargo	701-241-1310	Courtesy Reporting
Tri-County Water District		
Tri-County Water District	701-345-8240	Courtesy Reporting

* indicates 24 hour contact line.

Response Zone 4: External Notification References		
South Dakota		
Marshall County, SD (Britton)		
County Emergency Mgr.	605-448-2339	Courtesy Reporting
Local Emerg Planning Commission	605-448-2339	Courtesy Reporting
Local Public Safety Answering Point	605-448-5181*	Courtesy Reporting
County Sheriff's Office	605-448-5181*	Courtesy Reporting
Day County, SD (Webster)		
County Emergency Mgr.	605-345-3222*	Courtesy Reporting
Local Emerg Planning Commission	605-345-3222*	Courtesy Reporting
Local Public Safety Answering Point	605-345-3222*	Courtesy Reporting
County Sheriff's Office	605-345-3222*	Courtesy Reporting
Clark County, SD (Clark)		
County Emergency Mgr.	605-233-1236	Courtesy Reporting
Local Emerg Planning Commission	605-233-1236	Courtesy Reporting
Local Public Safety Answering Point	605-532-3822*	Courtesy Reporting
County Sheriff's Office	605-532-3822*	Courtesy Reporting
Beadle County, SD (Huron)		
County Emergency Mgr.	605-353-8421 605-354-1031	Courtesy Reporting
Local Emerg Planning Commission	605-353-8421 605-354-1031	Courtesy Reporting
Local Public Safety Answering Point	605-353-8550 605-353-8424	Courtesy Reporting
County Sheriff's Office	605-353-8424*	Courtesy Reporting
Kingsbury County, SD (De Smet)		
County Emergency Mgr.	605-854-3711	Courtesy Reporting
Local Emerg Planning Commission	605-854-3711	Courtesy Reporting
Local Public Safety Answering Point	605-854-3339 605-353-8550	Courtesy Reporting
County Sheriff's Office	605-854-3339*	Courtesy Reporting
Miner County, SD (Howard)		

County Emergency Mgr.	605-772-4533 605-579-0218	Courtesy Reporting
Local Emerg Planning Commission	605-772-4533 605-579-0218	Courtesy Reporting
Local Public Safety Answering Point	605-772-4501	Courtesy Reporting
County Sheriff's Office	605-772-4501*	Courtesy Reporting
Hanson County, SD (Alexandria)		
County Emergency Mgr.	605-239-4218	Courtesy Reporting
Local Emerg Planning Commission	605-239-4218	Courtesy Reporting
Local Public Safety Answering Point	605-239-4409	Courtesy Reporting
County Sheriff's Office	605-239-4409*	Courtesy Reporting
McCook County, SD (Salem)		
County Emergency Mgr.	605-421-8392	Courtesy Reporting
Local Emerg Planning Commission	605-421-8392	Courtesy Reporting
Local Public Safety Answering Point	605-995-8400 605-425-2761	Courtesy Reporting
County Sheriff's Office	605-425-2761*	Courtesy Reporting
Hutchinson County, SD (Parkston)		
County Emergency Mgr.	605-770-7927	Courtesy Reporting
Local Emerg Planning Commission	605-770-7927	Courtesy Reporting
Local Public Safety Answering Point	605-995-8400	Courtesy Reporting
County Sheriff's Office	605-387-2341*	Courtesy Reporting
Yankton County, SD (Yankton)		
County Emergency Mgr.	605-668-5289	Courtesy Reporting
Local Emerg Planning Commission	605-668-5289	Courtesy Reporting
Local Public Safety Answering Point	605-668-5210	Courtesy Reporting
County Sheriff's Office	605-668-3567*	Courtesy Reporting

* indicates 24 hour contact line.

Response Zone 4: External Notification References		
Nebraska		
Name	**Location**	**Description**
Cedar County, NE (Hartington)		
County Emergency Manager	402-254-6862	Courtesy Reporting
Local Emerg Planning Commission (LEPC)	402-254-6862	TYPE: Any spill or discharge that meets or exceeds the Federal Reportable Quantity VERBAL: Immediately, but not longer than 30 minutes WRITTEN: As requested by the Agency

		NOTE: As requested by the Agency
Local Public Safety Answering Point (PSAP)	402-254-6885 402-254-6451	Courtesy Reporting
County Sheriff's Office	402-254-6884*	Courtesy Reporting
Wayne County, NE (Wayne)		
County Emergency Mgr.	402-833-5190 / 402-640-4116	Courtesy Reporting
Local Emerg Planning Commission	402-649-5479	Courtesy Reporting
Local Public Safety Answering Point	402-375-2626	Courtesy Reporting
County Sheriff's Office	402-375-1911*	Courtesy Reporting
Stanton County, NE (Stanton)		
County Emergency Mgr.	402-649-0195	Courtesy Reporting
Local Emerg Planning Commission	402-439-2224	Courtesy Reporting
Local Public Safety Answering Point	402-439-2212*	Courtesy Reporting
County Sheriff's Office	402-439-2212*	Courtesy Reporting
Platte County, NE (Columbus)		
County Emergency Mgr.	402-564-1206 402-910-8898	Courtesy Reporting
Local Emerg Planning Commission	402-564-1206 402-910-8898	Courtesy Reporting
Local Public Safety Answering Point	402-564-3229*	Courtesy Reporting
County Sheriff's Office	402-564-3229*	Courtesy Reporting
Colfax County, NE (Schuyler)		
County Emergency Mgr.	402-352-7958	Courtesy Reporting
Local Emerg Planning Commission	402-352-7958	Courtesy Reporting
Local Public Safety Answering Point	402-352-8527	Courtesy Reporting
County Sheriff's Office	402-352-8514*	Courtesy Reporting
Butler County, NE (David City)		
County Emergency Mgr.	402-367-7400*	Courtesy Reporting
Local Emerg Planning Commission	402-367-7400*	Courtesy Reporting
Local Public Safety Answering Point	402-367-7400*	Courtesy Reporting
County Sheriff's Office	402-367-7400*	Courtesy Reporting
Seward County, NE (Seward)		
County Emergency Mgr.	402-643-4722 402-643-5761	Courtesy Reporting
Local Emerg Planning Commission	402-643-4722 402-643-5761	Courtesy Reporting
Local Public Safety Answering Point	402-643-3002	Courtesy Reporting
County Sheriff's Office	402-643-2359*	Courtesy Reporting
Jefferson County, NE (Fairbury)		
County Emergency Mgr.	402-729-3602 *	Courtesy Reporting

	402-587-0303	
Local Emerg Planning Commission	402-729-3602 * 402-587-0303	Courtesy Reporting
Local Public Safety Answering Point	402-729-3624	Courtesy Reporting
County Sheriff's Office	402-729-2284*	Courtesy Reporting
Saline County, NE (Wilber)		
County Emergency Mgr.	402-821-3010 402-826-7200	Courtesy Reporting
Local Emerg Planning Commission	402-821-3010 402-826-7200	Courtesy Reporting
Local Public Safety Answering Point	402-821-2111	Courtesy Reporting
Crete Public Safety Answering Point	402-826-4311	Courtesy Reporting
County Sheriff's Office	402-821-2111*	Courtesy Reporting
Gage County, NE (Beatrice)		
County Emergency Mgr.	402-223-1305 402-223-7031	Courtesy Reporting
Local Emerg Planning Commission	402-223-1305 402-223-7031	Courtesy Reporting
Local Public Safety Answering Point	402-223-4080	Courtesy Reporting
County Sheriff's Office	402-223-1382*	Courtesy Reporting
South Sioux City, NE		
South Sioux City, NE	402-494-7517 402-494-7500	Courtesy Reporting

* indicates 24 hour contact line.

Response Zone 5: Kansas, Missouri, and Illinois

Response Zone Contact Information		
Owner Name:	TC Energy	
Addresses:	(Physical Address)	
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)	
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.	
States/Counties Traversed:	Kansas (Base)	Marshall, Nemaha, Brown, Doniphan
	Missouri	Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, Audrain, Montgomery, Lincoln, St Charles
	Illinois	Madison, Bond, Fayette, Marion

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

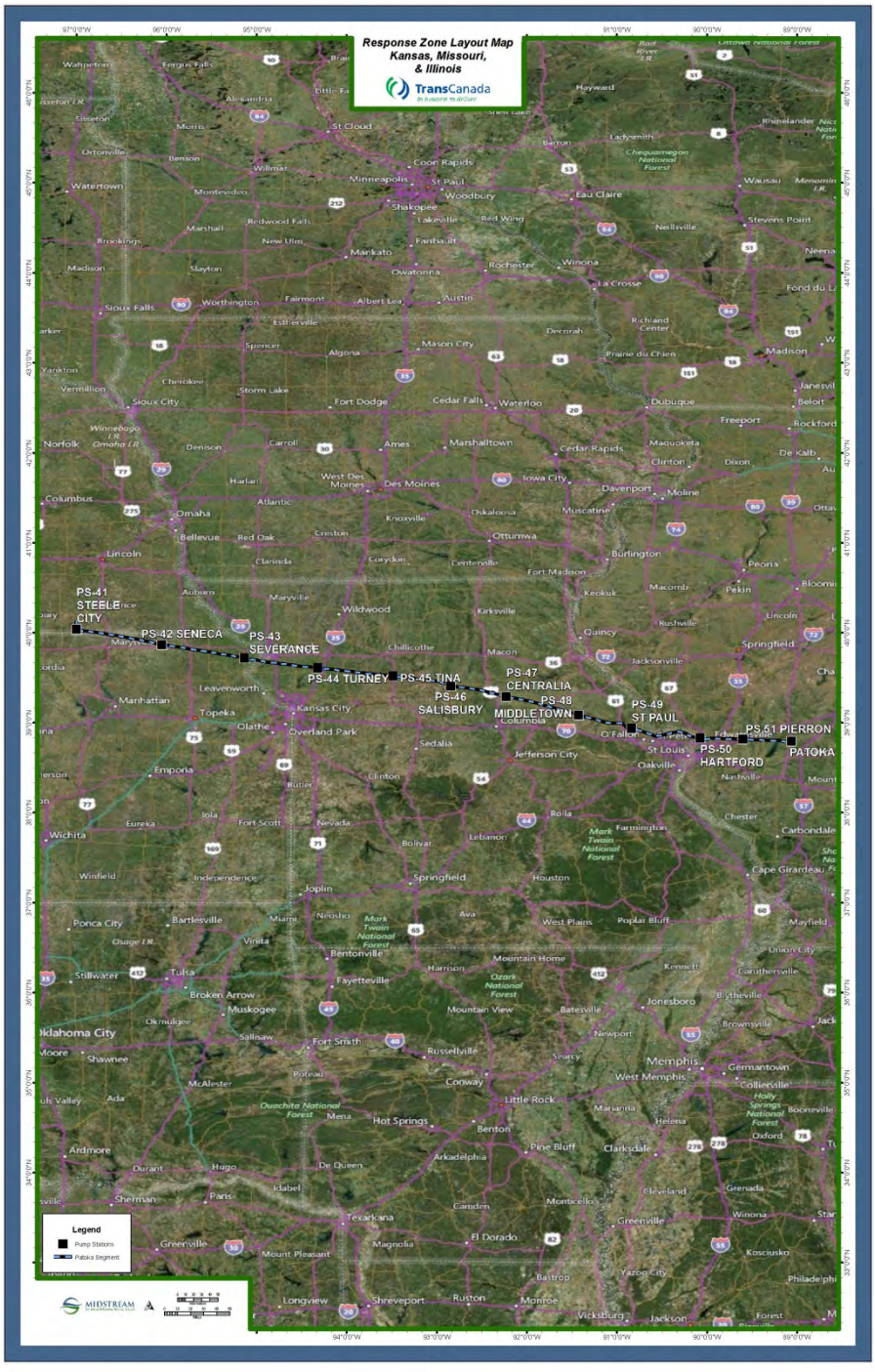
Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because the line section within the response zone has met the following criteria listed in 49CFR194.103(c)(1).

- The pipeline is greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length, and
- The pipeline is located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes, and
- The pipeline is located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas.

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	


Response Zone Layout Map
Kansas, Missouri, & Illinois
TransCanada
PS-41 STEELE CITY
PS-42 SENECA
PS-43 SEVERANCE
PS-44 TURNEY
PS-45 TINA
PS-46 SALISBURY
PS-47 CENTRALIA
PS-48 MIDDLETOWN
PS-49 ST PAUL
PS-50 HARTFORD
PS-51 PIERRON
PATOKA
Legend
Pump Stations
Patoka Segment
MIDSTREAM

Company Contact References for the following US Response Zones:

- North Dakota, South Dakota, Nebraska
- Kansas, Missouri, Illinois
- Cushing Extension
- Cushing Tank Terminal
- Gulf Coast
- Houston Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone:

- Kansas, Missouri, Illinois

FNAME	LNAME	TITLE	WORK	CELL
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Gateway Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 5: Pipeline Specifications

Location	Type of Oil	State	County
State Line / Seneca PS	Crude Oil	Kansas	Marshall, Nemaha
Seneca PS / Severance PS	Crude Oil	Kansas	Nemaha, Brown, Doniphan
Severance PS / Turney PS	Crude Oil	Kansas, Missouri	Doniphan, Buchanan, Clinton
Turney PS / Tina PS	Crude Oil	Missouri	Clinton, Caldwell, Carroll
Tina PS / Salisbury PS	Crude Oil	Missouri	Carroll, Chariton
Salisbury PS / Centralia PS	Crude Oil	Missouri	Chariton, Randolph, Audrain
Centralia PS / Middletown PS	Crude Oil	Missouri	Audrain, Montgomery
Middletown PS / Saint Paul PS	Crude Oil	Missouri	Montgomery, Lincoln
Saint Paul PS / Hartford PS	Crude Oil	Missouri, Illinois	Lincoln, St. Charles, Madison
Hartford PS / Patoka Terminal	Crude Oil	Illinois	Madison, Bond, Fayette, Marion

Response Zone 5: Company Owned Response Equipment

Equipment Type	Equipment ID	Location

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Response Zone 5: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
No Breakout Tanks in this Response Zone			

Response Zone 5: External Notification References		
Kansas		
Name	**Location**	**Description**
Marshall County		
County Emergency Mgr.	Marysville, KS	785-562-4550
Local Emerg Planning Commission	Marysville, KS	785-562-4550
Local Public Safety Answering Point	Marysville, KS	785-562-3141
County Sheriff's Office	Marysville, KS	785-562-3141
Nemaha County		
County Emergency Mgr.	Seneca, KS	785-294-0091 785-336-2429
Local Emerg Planning Commission	Seneca, KS	785-336-2430
Local Public Safety Answering Point	Seneca, KS	785-336-2311
County Sheriff's Office	Seneca, KS	785-336-2311
Brown County		
County Emergency Mgr.	Hiawatha, KS	785-742-7125

Local Emerg Planning Commission	Hiawatha, KS	785-742-7125
Local Public Safety Answering Point	Hiawatha, KS	785-742-7125
County Sheriff's Office	Hiawatha, KS	785-742-7125
Doniphan County		
County Emergency Mgr.	Troy, KS	785-985-2229
Local Emerg Planning Commission	Troy, KS	785-985-2229
Local Public Safety Answering Point	Troy, KS	785-985-3711
County Sheriff's Office	Troy, KS	785-985-3711

Response Zone 5: External Notification References		
Missouri		
Name	**Location**	**Description**
Buchanan County		
County Emergency Mgr.	City of St. Joseph	816-236-1486
County Emergency Mgr.	Buchanan County	816-383-0604
Local Emerg Planning Commission	St. Joseph, MO	816-383-0604
Local Public Safety Answering Point	St. Joseph, MO	816-271-4777
County Sheriff's Office	St. Joseph, MO	816-271-5590
Clinton County		
County Emergency Mgr.	Plattsburg, MO	816-539-2144
Local Emerg Planning Commission	Plattsburg, MO	816-539-2144
Local Public Safety Answering Point	Plattsburg, MO	816-539-2156
County Sheriff's Office	Plattsburg, MO	816-539-2156
Caldwell County		
County Emergency Mgr.	Kingston, MO	816-284-5939
Local Emerg Planning Commission	Kingston, MO	816-586-2311
Local Public Safety Answering Point	Kingston, MO	816-586-2681
County Sheriff's Office	Kingston, MO	816-586-2681
Carroll County		
County Emergency Mgr.	Carrollton, MO	660-542-0615/801-319-0580
Local Emerg Planning Commission	Carrollton, MO	660-542-2178/660-329-1000
Local Public Safety Answering Point	Carrollton, MO	660-542-3911
County Sheriff's Office	Carrollton, MO	660-542-2828
Chariton County		
County Emergency Mgr.	Brunswick, MO	660-973-0353
Local Emerg Planning Commission	Keytesville, MO	660-288-3277
Local Public Safety Answering Point	Keytesville, MO	660-288-3040
County Sheriff's Office	Keytesville, MO	660-288-3277
Randolph County		
County Emergency Mgr.	Moberly, MO	660-269-8705 ext. 2035
Local Emerg Planning Commission	Moberly, MO	660-269-8705 ext. 2035

Local Public Safety Answering Point	Moberly, MO	660-263-0346
County Sheriff's Office	Huntsville, MO	660-277-5095 660-277-5822
Audrain County		
County Emergency Mgr.	Mexico, MO	573-473-5892
Local Emerg Planning Commission	Mexico, MO	573-473-5892
Local Public Safety Answering Point	Mexico, MO	573-473-5800
County Sheriff's Office	Mexico, MO	573-473-5800
Montgomery County		
County Emergency Mgr.	Montgomery City, MO	573-564-2283
Local Emerg Planning Commission	Montgomery City, MO	573-564-2283
Local Public Safety Answering Point	Montgomery City, MO	573-564-3378
County Sheriff's Office	Montgomery City, MO	573-564-8084
Lincoln County		
County Emergency Mgr.	Troy, MO	636-528-6182 636-528-6300 ext. 2248
Local Emerg Planning Commission	Troy, MO	636-528-6182 636-528-6300 ext. 2248
Local Public Safety Answering Point	Troy, MO	636-528-6100
County Sheriff's Office	Troy, MO	636-528-8546
St. Charles County		
County Emergency Mgr.	St. Charles, MO	636-949-3023
Local Emerg Planning Commission	St. Charles, MO	636-949-3023
Local Public Safety Answering Point		636-949-3000
County Sheriff's Office	O'Fallon, MO	636-949-3000

Response Zone 5: External Notification References		
Illinois		
Name	**Location**	**Description**
Madison County		
County Emergency Mgr.	Wood River, IL	618-296-4478 618-692-0537
Local Emerg Planning Commission	Wood River, IL	618-296-4528
Local Public Safety Answering Point	Wood River, IL	618-692-4443
County Sheriff's Office	Wood River, IL	618-692-6087
Wood River Dispatch (Wood River, Roxanna, Hartford)	Wood River, IL	618-251-3114
Bond County		
County Emergency Mgr.	Greenville, IL	618-664-3531
Local Emerg Planning Commission	Greenville, IL	618-664-3531
Local Public Safety Answering Point	Greenville, IL	618-664-2151
County Sheriff's Office	Greenville, IL	618-664-2151

Fayette County		
County Emergency Mgr.	Vandalia, IL	618-283-4292
Local Emerg Planning Commission	Vandalia, IL	618-283-4292
Local Public Safety Answering Point	Vandalia, IL	618-283-2141
Vandalia Public Safety Answering Point	Vandalia, IL	618-283-2131
County Sheriff's Office	Vandalia, IL	618-283-2141
Marion County		
County Emergency Mgr.	Salem, IL	618-267-0066
Local Emerg Planning Commission	Salem, IL	618-267-0066
Local Public Safety Answering Point	Salem, IL	618-548-2141 ext. 1 after hours
County Sheriff's Office	Salem, IL	618-548-2141

Response Zone 6: Cushing Extension

Response Zone Contact Information		
Owner Name:	TC Energy	
Addresses:	(Physical Address)	
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)	
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.	
States/Counties Traversed:	Nebraska (Cushing Ext)	Jefferson
	Kansas (Cushing Ext)	Washington, Clay, Dickinson, Marion, Butler, Cowley
	Oklahoma	Kay, Noble, Payne, Lincoln

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because the line section within the response zone has met the following criteria listed in 49CFR194.103(c)(1).

- The pipeline is greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length, and
- The pipeline is located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes, and
- The pipeline is located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas.

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	


Response Zone Layout Map
Cushing Extension
TransCanada
PS 41
STEELE CITY
PS CE-30 HOPE
PS CE-32 ROCK
PS CE-33
PONCA CITY
CUSHING
Legend
Pump Stations
Cushing Segment
MIDSTREAM

Company Contact References for the following US Response Zones:

- North Dakota, South Dakota, Nebraska
- Kansas, Missouri, Illinois
- Cushing Extension
- Cushing Tank Terminal
- Gulf Coast
- Houston Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone:

- Cushing Extension

FNAME	LNAME	TITLE	WORK	CELL
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Gateway Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cimarron Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 6: Pipeline Specifications

Location	Type of Oil	State	County/Description
Station Steele City / Hope PS	Crude Oil	Nebraska, Kansas	Jefferson, Washington, Clay, Dickinson
Hope PS / Rock PS	Crude Oil	Kansas	Dickinson, Marion, Butler, Cowley
Rock PS / Ponca City PS	Crude Oil	Kansas, Oklahoma	Cowley, Kay
Ponca City PS / Cushing Extension	Crude Oil	Oklahoma	Kay, Noble, Payne, Lincoln

Response Zone 6: Company Owned Response Equipment

Equipment Type	Equipment ID	Location

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Response Zone 6: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
There are zero (0) breakout tanks in this Response Zone.			

Response Zone 6: External Notification References		
Nebraska		
Name	**Location**	**Description**
Jefferson County		
County Emergency Mgr.	Fairbury, NE	402-729-3602 402-587-0303
Local Emerg Planning Commission	Fairbury, NE	402-729-3602 402-587-0303
Local Public Safety Answering Point	Fairbury, NE	402-729-3624
County Sheriff's Office	Fairbury, NE	402-729-2284

Response Zone 6: External Notification References		
Kansas		
Name	**Location**	**Description**
Washington County		
County Emergency Mgr.	Washington, KS	785-325-2134
Local Emerg Planning Commission	Washington, KS	n/a
Local Public Safety Answering Point	Washington, KS	785-325-2293
County Sheriff's Office	Washington, KS	785-325-2293
Clay County		
County Emergency Mgr.	Clay Center, KS	785-632-5802
Local Emerg Planning Commission	Clay Center, KS	785-632-5802
Local Public Safety Answering Point	Clay Center, KS	785-632-5601
County Sheriff's Office	Clay Center, KS	785-632-5601
Dickinson County		
County Emergency Mgr.	Abilene, KS	785-263-3608
Local Emerg Planning Commission	Abilene, KS	785-263-1121
Local Public Safety Answering Point	Abilene, KS	785-263-4041
County Sheriff's Office	Abilene, KS	785-263-4081
Marion County		

County Emergency Mgr.	Marion, KS	620-382-2144
Local Emerg Planning Commission	Marion, KS	620-382-2189
Local Public Safety Answering Point	Marion, KS	620-382-2144
County Sheriff's Office	Marion, KS	620-382-2144
Butler County		
County Emergency Mgr.	Augusta, KS	316-733-9796
Local Emerg Planning Commission	Augusta, KS	316-733-9796
Local Public Safety Answering Point	El Dorado, KS	316-322-4254
County Sheriff's Office	El Dorado, KS	316-322-4254
Cowley County		
County Emergency Mgr.	Winfield, KS	620-221-0470
Local Emerg Planning Commission	Winfield, KS	620-221-2300
Local Public Safety Answering Point	Winfield, KS	620-221-5555
County Sheriff's Office	Winfield, KS	620-221-5444
County Sheriff's Office	Arkansas City, KS	620-221-5555

Response Zone 6: External Notification References		
Oklahoma		
Name	**Location**	**Description**
Kay County		
County Emergency Mgr.	Newkirk, OK	580-362-3825
Local Emerg Planning Commission	Ponca City, OK	580-767-0380
Local Public Safety Answering Point	Ponca City, OK	580-763-8011
County Sheriff's Office	Newkirk, OK	580-353-2517
Noble County		
County Emergency Mgr.	Perry, OK	580-307-5203
Local Emerg Planning Commission	Perry, OK	580-336-1717
Local Public Safety Answering Point	Perry, OK	580-336-3517
County Sheriff's Office	Perry, OK	580-336-3517
Payne County		
County Emergency Mgr.	Stillwater, OK	405-533-6875
Local Emerg Planning Commission	Stillwater, OK	405-533-6875
Local Public Safety Answering Point	Stillwater, OK	405-372-4522
County Sheriff's Office	Stillwater, OK	405-372-4522

Response Zone 7: Cushing Tank Terminal

Response Zone Contact Information		
Owner Name:	TC Energy	
Addresses:	(Physical Address)	
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)	
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.	
States/Counties Traversed:	Oklahoma	Lincoln

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

Information Summary

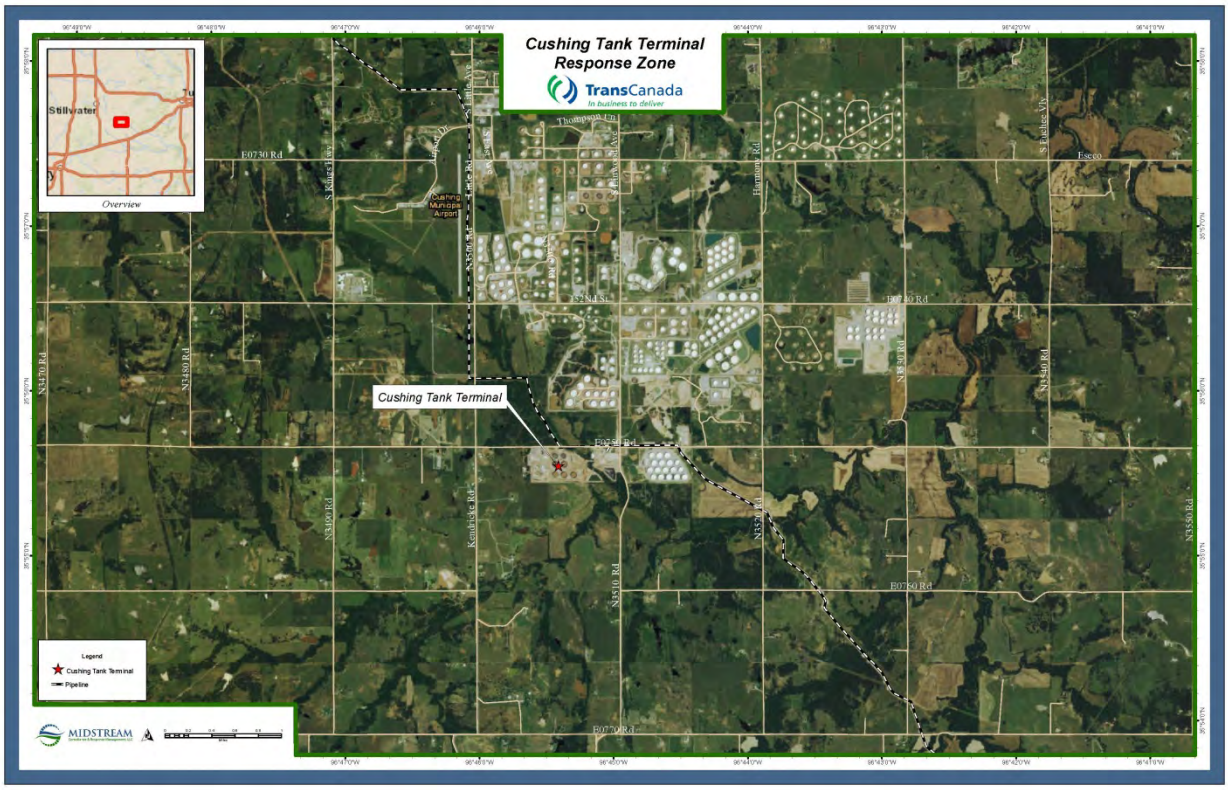
Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because the line section within the response zone has met the following criteria listed in 49CFR194.103(c)(1).

- The pipeline is greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length, and
- The pipeline is located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes, and
- The pipeline is located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas.

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	

Cushing Tank Terminal is located on the southern end of the Cushing Terminal Complex. TC Energy's Cushing Terminal is located approximately four (4) miles south of Highway 18 and one (1) mile east of South Little Avenue.



Company Contact References for the following US Response Zones:

- North Dakota, South Dakota, Nebraska
- Kansas, Missouri, Illinois
- Cushing Extension
- Cushing Tank Terminal
- Gulf Coast
- Houston Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Qualified Individuals for the following Response Zone:

- Cushing Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cimarron Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Response Zone 7: Pipeline Specifications

Location	Type of Oil	State	County/Description
This Response Zone only includes Breakout Tanks at Cushing Terminal. This Response Zone includes zero (0) miles of pipe and zero (0) pipe segments.			

Response Zone 7: Company Owned Response Equipment		
Equipment Type	**Equipment ID**	**Location**

Response Zone 7: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
			Crude
			Crude
			Crude
			Crude
			Crude
			Crude
			Crude
			Crude
			Crude
			Crude

Response Zone 7: External Notification References		
Oklahoma		
Name	**Location**	**Description**
Payne County		
County Emergency Mgr.	Stillwater, OK	405-533-6875
Local Emerg Planning Commission	Stillwater, OK	405-533-6875
Local Public Safety Answering Point	Stillwater, OK	405-372-4522
County Sheriff's Office	Stillwater, OK	405-372-4522
Lincoln County		
County Emergency Mgr.	Chandler, OK	405-240-6198
Local Emerg Planning Commission	Chandler, OK	405-240-7741
Local Public Safety Answering Point	Chandler, OK	405-258-9933
County Sheriff's Office	Chandler, OK	405-258-1191

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes tank names/volumes.

Response Zone 8: Gulf Coast

Response Zone Contact Information		
Owner Name:	TC Energy	
Addresses:	(Physical Address)	
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)	
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.	
States/Counties Traversed:	Oklahoma	Lincoln, Creek, Okfuskee, Seminole, Hughes, Coal, Atoka, Bryan
	Texas	Fannin, Lamar, Delta, Hopkins, Franklin, Wood, Upshur, Smith, Cherokee, Rusk, Nacogdoches, Angelina, Polk, Liberty, Hardin, Jefferson, Chambers, Harris

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because the line section within the response zone has met the following criteria listed in 49CFR194.103(c)(1).

- The pipeline is greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length, and
- The pipeline is located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes, and
- The pipeline is located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas.

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	


TransCanada Keystone Gulf Coast Segment Overview
TransCanada
PS-32 Cushing South
Cushing
PS-33 Cromwell
PS-34 Tupelo
PS-35 Bryan
PS-36 Delta
PS-37 Winnsboro
PS-38 Lake Tyler
PS-39 Lufkin
PS-40 Corrigan
PS-41 Liberty
South Lake
Beaumont
Nederland
Port Arthur
Houston
Dallas
Oklahoma City
Legend
Terminals
Pump Stations
Keystone Gulf Coast Segment
Houston Lateral
Citgo Lateral
MIDSTREAM

Company Contact References for the following US Response Zones: • North Dakota, South Dakota, Nebraska • Kansas, Missouri, Illinois • Cushing Extension • Cushing Tank Terminal • Gulf Coast • Houston Tank Terminal				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Vice President – Liquid Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Sr. Emergency Management Specialist	XXX-XXX-XXXX	XXX-XXX-XXXX

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Qualified Individuals for the following Response Zone: • Gulf Coast				
FNAME	**LNAME**	**TITLE**	**WORK**	**CELL**
		Director - US Liquids Operations	XXX-XXX-XXXX	XXX-XXX-XXXX
		Cimarron Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX
		Red River Area Manager	XXX-XXX-XXXX	XXX-XXX-XXXX

Response Zone 8: Pipeline Specifications			
Location	**Type of Oil**	**State/Province**	**County/Description**
Cushing South PS/ Cromwell PS	Crude Oil	Oklahoma	Lincoln, Creek, Okfuskee, Seminole
Cromwell PS/ Tupelo PS	Crude Oil	Oklahoma	Seminole, Hughes, Coal
Tupelo PS/ Bryan PS	Crude Oil	Oklahoma	Coal, Atoka, Bryan
Bryan PS/ Delta PS	Crude Oil	Oklahoma, Texas	Bryan, Fannin, Lamar, Delta, Hopkins
Delta PS/ Winnsboro PS	Crude Oil	Texas	Hopkins, Franklin, Wood
Winnsboro PS/ Lake Tyler PS	Crude Oil	Texas	Wood, Upshur, Smith
Lake Tyler PS/ Lufkin PS	Crude Oil	Texas	Smith, Cherokee, Rusk, Nachogdoches
Lufkin PS/ Corrigan PS	Crude Oil	Texas	Cherokee, Angelina, Polk
Corrigan PS/ Liberty PS	Crude Oil	Texas	Polk, Hardin, Liberty
Libery PS/end of Pipeline at Sour Lake	Crude Oil	Texas	Hardin
Liberty PS/end of Pipeline at Nederland	Crude Oil	Texas	Liberty, Hardin, Jefferson
Liberty PS/end of Pipeline at Houston	Crude Oil	Texas	Liberty, Chambers, Harris

Response Zone 8: Company Owned Response Equipment		
Equipment Type	**Equipment ID**	**Location**

Response Zone 8: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
No Breakout Tanks in this Response Zone			

Response Zone 8: External Notification References		
Oklahoma		
Name	**Location**	**Description**
Lincoln County		
County Emergency Mgr.	Chandler, OK	405-240-6198
Local Emerg Planning Commission	Chandler, OK	405-240-7741
Local Public Safety Answering Point	Chandler, OK	405-258-9933
County Sheriff's Office	Chandler, OK	405-258-1191
Ofuskee County		
County Emergency Mgr.	Okemah, OK	918-623-9289
Local Emerg Planning Commission	Okemah, OK	918-623-9289
Local Public Safety Answering Point	Okemah, OK	918-623-1234
County Sheriff's Office	Okemah, OK	918-623-1122
Seminole County		
County Emergency Mgr.	Wewoka, OK	405-257-5445
Local Emerg Planning Commission	Wewoka, OK	405-257-5445/405-220-2557
Local Public Safety Answering Point	Seminole, OK	405-382-9340
County Sheriff's Office	Wewoka, OK	405-257-5445
Hughes County		
County Emergency Mgr.	Holdenville, OK	405-379-7740
Local Emerg Planning Commission	Holdenville, OK	405-379-7740
Local Public Safety Answering Point	Holdenville, OK	405-712-6003
County Sheriff's Office	Holdenville, OK	405-712-6003
Coal County		
County Emergency Mgr.	Coalgate, OK	580-258-0603
Local Emerg Planning Commission	Coalgate, OK	580-258-0151
Local Public Safety Answering Point	Coalgate, OK	580-927-2121
County Sheriff's Office	Coalgate, OK	580-927-2121
Atoka County		
County Emergency Mgr.	Atoka, OK	580-889-4038
Local Emerg Planning Commission	Atoka, OK	580-889-2221 580-889-4038
Local Public Safety Answering Point	Atoka, OK	580-889-2221
County Sheriff's Office	Atoka, OK	580-889-2221

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Creek County		
County Emergency Mgr.	Salpulpa, OK	918-227-0278
Local Emerg Planning Commission	Salpulpa, OK	918-227-6358
Local Public Safety Answering Point	Salpulpa, OK	918-224-4964
County Sheriff's Office	Salpulpa, OK	918-224-4964
Bryan County		
County Emergency Mgr.	Durant, OK	580-924-3661
Local Emerg Planning Commission	Durant, OK	580-924-3661
Local Public Safety Answering Point	Durant, OK	580-924-3737
County Sheriff's Office	Durant, OK	580-924-3000

Response Zone 8: External Notification References		
Texas		
Name	**Location**	**Description**
Fannin County		
County Emergency Mgr.	Bonham, TX	903-640-8484
Local Emerg Planning Commission	Bonham, TX	903-640-8484
Local Public Safety Answering Point	Bonham, TX	903-583-2143
Bonham Public Safety Answering Point	Bonham, TX	903-583-2144
County Sheriff's Office	Bonham, TX	903-583-2143
Lamar County		
County Emergency Mgr.	Paris, TX	903-737-2410
Local Emerg Planning Commission	Paris, TX	903-737-2411
Local Public Safety Answering Point	Paris, TX	903-784-7655
County Sheriff's Office	Paris, TX	903-737-2400
Delta County		
County Emergency Mgr.	Cooper, TX	903-395-4400 ext 243
Local Emerg Planning Commission	Cooper, TX	903-395-4400 ext 243
Local Public Safety Answering Point	Cooper, TX	903-395-2146
County Sheriff's Office	Cooper, TX	903-395-2146
Hopkins County		
County Emergency Mgr.	Sulhpur Springs, TX	903-439-6217
Local Emerg Planning Commission	Sulhpur Springs, TX	903-439-6217
Local Public Safety Answering Point	Sulhpur Springs, TX	903-438-4040
County Sheriff's Office	Sulhpur Springs, TX	903-438-4040
Franklin County		
County Emergency Mgr.	Mt. Vernon, TX	903-537-2342 ext: 225 903-537-4539
Local Emerg Planning Commission	Mt. Vernon, TX	903-537-4539
Local Public Safety Answering Point	Mt. Vernon, TX	903-537-4539
County Sheriff's Office	Mt. Vernon, TX	903-537-4539
Wood County		
County Emergency Mgr.	Quitman, TX	903-763-2356

Local Emerg Planning Commission	Quitman, TX	903-763-2356
Local Public Safety Answering Point	Quitman, TX	903-763-5462
County Sheriff's Office	Quitman, TX	903-763-2201
Upshur County		
County Emergency Mgr.	Gilmer, TX	903-680-8148
Local Emerg Planning Commission	Gilmer, TX	903-843-4003
Local Public Safety Answering Point	Gilmer, TX	903-843-2541
County Sheriff's Office	Gilmer, TX	903-843-2541
Smith County		
County Emergency Mgr.	Tyler, TX	903-590-2652
Local Emerg Planning Commission	Tyler, TX	903-590-2652
Local Public Safety Answering Point	Tyler, TX	903-566-6600
County Sheriff's Office	Tyler, TX	903-590-2600
Rusk County		
County Emergency Mgr.	Henderson, TX	903-657-8571
Local Emerg Planning Commission	Henderson, TX	903-657-0326
Local Public Safety Answering Point	Henderson, TX	903-657-3581
County Sheriff's Office	Henderson, TX	903-657-3581
Cherokee County		
County Emergency Mgr.	Rusk, TX	903-683-5947
Local Emerg Planning Commission	Rusk, TX	903-683-5947
Local Public Safety Answering Point	Jacksonville, TX	903-683-2271
County Sheriff's Office	Rusk, TX	903-683-2271
Nacogdoches County		
County Emergency Mgr.	Nacogdoches, TX	936-560-7871 936-652-1349
Local Emerg Planning Commission	Nacogdoches, TX	936-560-7871 936-652-1349
Local Public Safety Answering Point	Nacogdoches, TX	936-559-2607
County Sheriff's Office	Nacogdoches, TX	936-560-7794
Angelina County		
County Emergency Mgr.	Lufkin, TX	936-634-8731
Local Emerg Planning Commission	Lufkin, TX	936-634-8731
Local Public Safety Answering Point	Lufkin, TX	936-633-0356
Lufkin Public Safety Answering Point	Lufkin, TX	936-634-3331 936-829-5586
County Sheriff's Office	Lufkin, TX	936-634-3332
Polk County		
County Emergency Mgr.	Livingston, TX	936-327-6826
Local Emerg Planning Commission	Livingston, TX	936-327-6826
Local Public Safety Answering Point	Livingston, TX	936-327-6810
County Sheriff's Office	Livingston, TX	936-327-6810
Hardin County		

County Emergency Mgr.	Kountze, TX	409-246-5119
Local Emerg Planning Commission	Lumberton, TX	409-246-5119
Local Public Safety Answering Point	Kountze, TX	409-246-5100
County Sheriff's Office	Kountze, TX	409-246-5100
Liberty County		
County Emergency Mgr.	Liberty, TX	936-334-3219
Local Emerg Planning Commission	Liberty, TX	936-334-3219
Local Public Safety Answering Point	Liberty, TX	936-336-4500
County Sheriff's Office	Liberty, TX	936-336-4500
Jefferson County		
County Emergency Mgr.	Port Arthur, TX	409-835-8757
Local Emerg Planning Commission	Port Arthur, TX	409-835-8757
Local Public Safety Answering Point	Port Arthur, TX	409-835-8411
County Sheriff's Office	Port Arthur, TX	409-983-8350
County Engineer	Port Arthur, TX	409-835-8584
Chambers County		
County Emergency Mgr.	Anahuac, Texas	409-267-2445
Local Emerg Planning Commission	Anahuac, Texas	409-267-8343
Local Public Safety Answering Point	Anahuac, Texas	409-267-2500
County Sheriff's Office	Anahuac, Texas	409-267-2500
Harris County		
Harris County Homeland Security and Emergency Management	Houston, TX	713-881-3300
Local Emerg Planning Commission	Houston, TX	713-884-4227
Local Public Safety Answering Point	Houston, TX	713-221-6000
County Sheriff's Office	Houston, TX	713-221-6000
Sheldon Fire & Rescue (Station 2)	Houston, TX	281-456-9255
Crosby Fire Department	Crosby, TX	281-328-2300
Port Authority of Houston (For incidents impacting San Jacinto River, Cedar Bayou, and Muleshoe Lake)	713-670-3611* (emergency) 713-670-3620* (non-emergency)	Upon becoming aware of an escape of any substance from the Pipeline, POHA Permit Licensee shall immediately notify the Port, and confirm such notification in writing no later than ten (10) days after the escape of the substance, whether or not it causes damage or destruction to individuals, entities or property, and whether or not civil penalties or fines are incurred. The notice shall state the location and duration of the escape, and the nature of the substance that escaped.

Response Zone 9: Houston Tank Terminal

Response Zone Contact Information		
Owner Name:	TC Energy	
Addresses:	(Physical Address)	
24 Hour Emergency Contact Phone #:	X-XXX-XXX-XXXX (24 Hours)	
Telephone/Fax:	Telephone references, including 24-hour numbers, for the Facility, Owner, and Qualified Individual/Alternate Qualified Individual are provided in Figure 2.2.	
States/Counties Traversed:	Texas	Harris

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes confidential Company locations, phone numbers and Worst Case Discharge amounts.

Information Summary

Determination of Significant and Substantial Harm (United States Department of Transportation/ Pipeline and Hazardous Materials Safety Administration):

This Response Zone has been determined to meet the significant and substantial harm classification because the line section within the response zone has met the following criteria listed in 49CFR194.103(c)(1).

- The pipeline is greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length, and
- The pipeline is located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes, and
- The pipeline is located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas.

Worst Case Discharge (Refer to Appendix B for calculations)	
Potential Oil Group	3
United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Planning Volume	

Houston Tank Terminal is located in eastern Harris County, TX. The Tank Terminal is located at the end of the Houston Lateral, a pipe segment within the Keystone Pipeline System.

Company Contact References for the following US Response Zones:

- North Dakota, South Dakota, Nebraska
- Kansas, Missouri, Illinois
- Cushing Extension
- Cushing Tank Terminal
- Gulf Coast
- Houston Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Vice President – Liquid Operations		
		Sr. Emergency Management Specialist		

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes names and contact information of Company employees.

Qualified Individuals for the following Response Zone:

- Houston Tank Terminal

FNAME	LNAME	TITLE	WORK	CELL
		Director - US Liquids Operations		
		Red River Area Manager		

Response Zone 9: Pipeline Specifications

Location	Type of Oil	State/Province	County/Description
This Response Zone only includes Breakout Tanks at Houston Terminal. This Response Zone includes zero (0) miles of pipe and zero (0) pipe segments.			

Response Zone 9: Company Owned Response Equipment		
Equipment Type	**Equipment ID**	**Location**

Response Zone 9: Breakout Tanks			
Tank Name	**Facility Number**	**Capacity (Bbls)**	**Type of Oil**
			Crude
			Crude
			Crude
			Crude

Response Zone 9: External Notification References		
Texas		
Name	**Location**	**Description**
Harris County		
Harris County Homeland Security and Emergency Management	Houston, TX	713-881-3100
Local Emerg Planning Commission	Houston, TX	713-884-4227
Local Public Safety Answering Point	Houston, TX	713-221-6000
County Sheriff's Office	Houston, TX	713-221-6000
Sheldon Fire & Rescue (Station 2)	Houston, TX	281-456-9255
Crosby Fire Department	Crosby, TX	281-328-2300

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes the types, quantities and locations of Company owned equipment.

Information has been redacted from this section to protect the safety and security of TC Energy. Information redacted includes tank names/volumes.