

## ST57-2013

### Field Surveillance and Operations Branch – Field Operations Provincial Summary 2012



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## **ENERGY RESOURCES CONSERVATION BOARD**

*ST57-2013: Field Surveillance and Operations Branch – Field Operations Provincial Summary  
2012*

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## 1. Overview

### 1.1 Purpose

This report provides stakeholders with statistics and information on oil and gas activity, Energy Resources Conservation Board (ERCB) inspection results, and industry compliance with requirements. A five-year overview of inspection and compliance is included, based on data for 2008 through 2012.

### 1.2 Field Inspection Summary

Operating from nine ERCB field centres throughout Alberta, Field Surveillance and Operations Branch (FSOB) staff inspect construction, operation, and abandonment activities related to upstream oil and gas energy development. They also respond to emergencies and public complaints on a 24-hour basis. Inspection results for each field inspection category in 2012 are summarized in Table 1.

FSOB staff conducted 12 500 random and prioritized inspections in 2012. Concentrating on high risk operations or operations involving complaints or incidents, the FSOB's approach placed a greater focus on operational management systems audits<sup>1</sup> for pipeline operations—audits that support regular field inspection activities. As a result, levels of high risk noncompliance were higher in 2012, a slight increase when compared with 2011 levels (see Table 1).

Focused inspections for drilling and pipeline operations, including operational management systems audits, will continue in 2013. Data collected from inspections will be used to develop the ERCB's new Safety and Loss Management System (pipelines) Assurance Program and for other operational planning.

Industry incident numbers increased slightly in 2012, and in most cases, released volumes were small or contained on lease. The pipeline failure rate for 2012 remained the same as reported in 2011 at 1.5 failures per 1000 kilometres (km).

Table 1. Field inspection summary, 2012

Field inspection category	Inspections	High risk noncompliant
Drilling operations	383	53
Well sites*	3 970	88
Well servicing	249	6
Oil facilities*	4 101	68
Gas facilities*	1 974	48
Pipelines	1 435	174
Drilling waste	155	10
Waste facilities	215	0
<b>Total</b>	<b>12 482</b>	<b>447</b>

\*Includes air monitoring inspections.

<sup>1</sup> Operational management systems audits evaluate system controls such as policies, procedures, and processes.

There were 447 high risk noncompliant inspections compared to 437 in 2011.

The ERCB has two mobile ambient air monitoring units that read and record hydrogen sulphide (H<sub>2</sub>S) and sulphur dioxide (SO<sub>2</sub>) concentrations in parts per billion. Monitoring is also conducted with forward-looking infrared cameras that are capable of detecting hydrocarbon leaks.

Table 2 shows the number of air monitoring inspections from 2008 to 2012.

Table 2. Air monitoring inspections

	2008	2009	2010	2011	2012
Well site	16	48	33	97	21
Oil facility	374	535	557	383	468
Gas facility	161	439	316	263	224

In 2012, there were 713 air monitoring inspections, of which 11 were high risk noncompliant. The most common reasons for high risk noncompliance included H<sub>2</sub>S off-lease odours, inadequate 24-hour emergency signage, and a company's lack of immediate emergency response.

Table 3 shows the 2012 operational suspensions by field inspection category.

Table 3. Operational suspensions

Field inspection category	Number of suspensions
Drilling operations	3
Well sites	5
Well servicing	1
Oil facilities	8
Gas facilities	2
Pipelines	32
Drilling waste	0
Waste facilities	0
<b>Total</b>	<b>51</b>

### 1.3 Summary of Concerns, Releases, and Blowouts

The ERCB receives public complaints about industry activity. These complaints, which may include one or more concerns, are logged, and all are investigated by ERCB field surveillance staff. In 2012, there were 754 public complaints with a total of 963 concerns identified.

There was a significant increase in concerns from the public compared with 2011. The increase is in the well category and relates specifically to health and odour issues in northwestern Alberta. The ERCB continues to focus on these concerns in 2013.

The ERCB has grouped the concerns as follows:

- health<sup>2</sup>—about possible impacts on human or animal health by upstream oil and gas activities;
- odours—all odour types (e.g., H<sub>2</sub>S, SO<sub>2</sub>, etc.);
- operational impacts—about facility operations (e.g., explosion, fire, flare, smoke, spill, uncontrolled flow, nuisance, noise, dust, etc.); and
- physical impacts—about possible impacts on public safety, land, water wells, or other (e.g., lease management, public hazard, property damage, water wells, etc.).

Figure 1 illustrates the total number of concerns from 2008 to 2012.

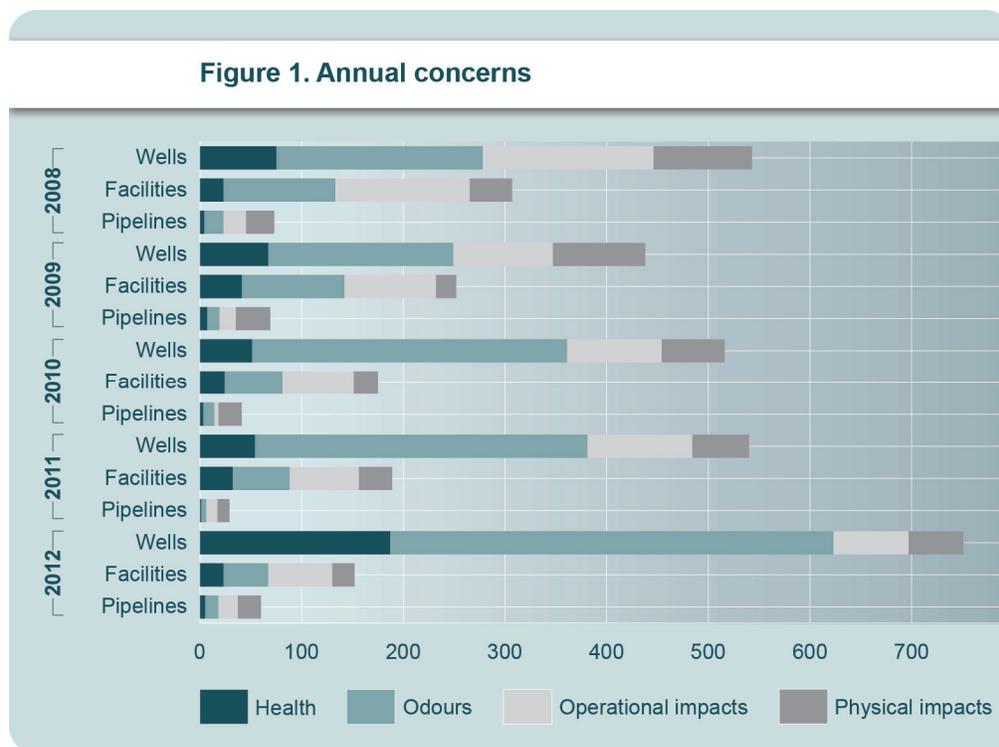
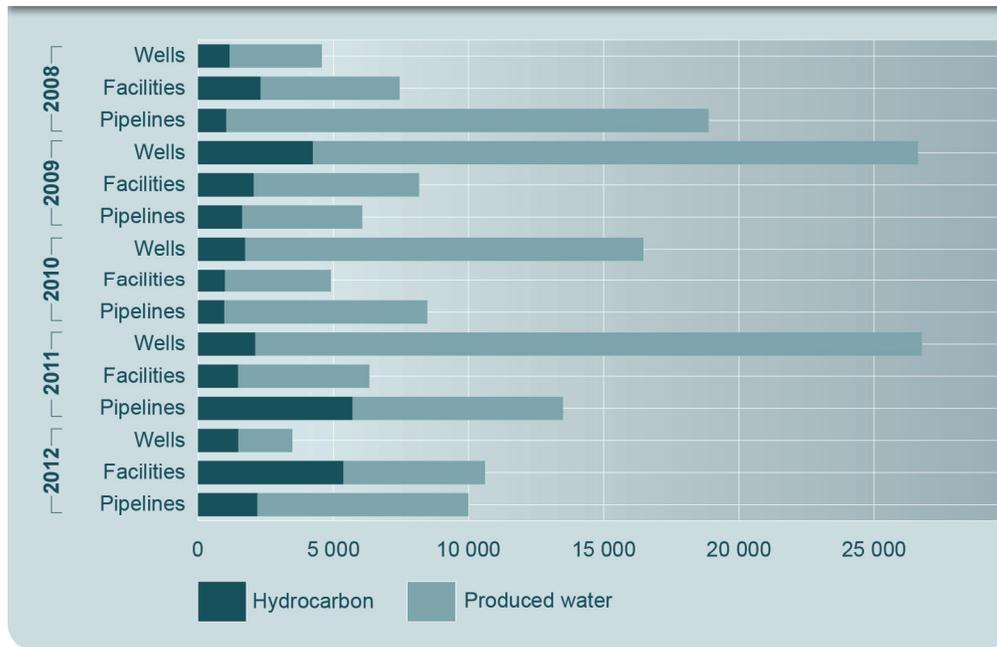


Figure 2 shows the annual liquid hydrocarbon and water release volumes (m<sup>3</sup>) from 2008 to 2012.

<sup>2</sup> Health concerns fall under the jurisdiction of the Government of Alberta and are not a part of the ERCB mandate. These concerns were acknowledged and redirected, or the complainant was advised to contact the appropriate health authority.

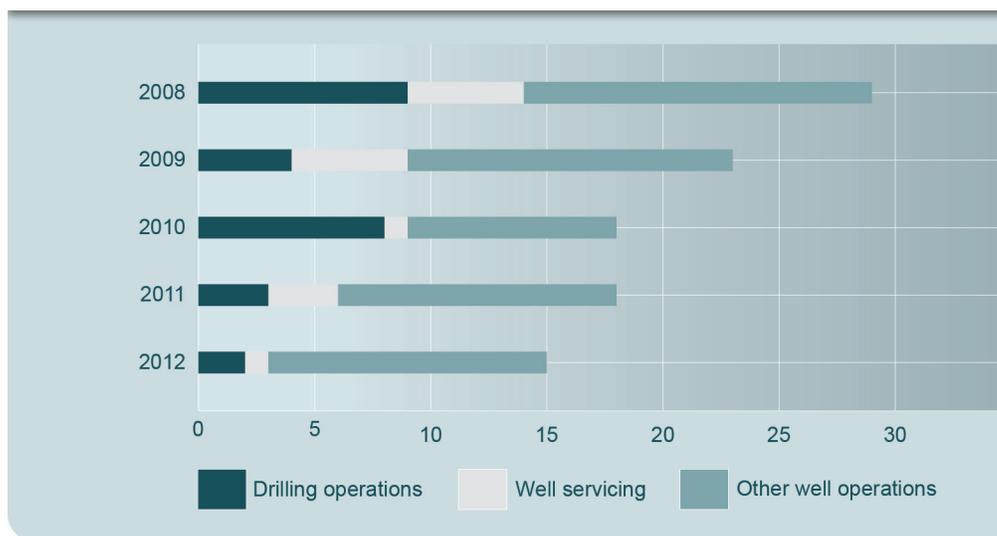
**Figure 2. Annual liquid release volumes (m<sup>3</sup>)**



There was a significant reduction in liquid release volumes in 2012 compared to 2011. This reduction was primarily due to two large releases that occurred in 2011.

Figure 3 shows the annual well blowouts from 2008 to 2012. There was a reduction in blowouts from 18 in 2011 to 15 in 2012.

**Figure 3. Annual well blowouts**



## 2. Field Inspection Categories

This section outlines oil and gas inspection categories that are regulated and inspected by ERCB field surveillance staff. It also outlines the most common high risk noncompliant events associated with each category.

Each field centre conducts inspections in eight categories: drilling operations, well sites, well servicing, oil facilities, gas facilities, pipelines, drilling waste, and waste facilities.

The field inspection categories are broken down further into inventory, inspections, and incidents, where applicable.

### 2.1 Drilling Operations

#### Inventory

Table 4 shows the number of drilling operations from 2008 to 2012.

Table 4. Drilling operations

	2008	2009	2010	2011	2012
Total	15 417	7232	9793	10 711	9286

#### Inspections

Table 5 shows the number of drilling inspections from 2008 to 2012.

Table 5. Drilling inspections

	2008	2009	2010	2011	2012
Total	357	409	326	362	383

Of the 383 drilling inspections conducted in 2012, 53 were high risk noncompliant. Data collected from the 2012 drilling inspections shows a slight increase in the rate of high risk noncompliance compared with 2011. As a result, focus will continue in this area in 2013. The most common reasons for high risk noncompliance were

- inadequate STICK diagrams,
- inadequate pressure testing, and
- inadequate backup nitrogen systems.

## 2.2 Well Sites

### Inventory

Table 6 shows the 2012 licensed well inventory. The 2011 inventory was 413 801.

Table 6. Licensed wells

Well type	
Oil well	56 462
Gas well	108 723
Coalbed methane gas well	18 376
Shale gas well	59
Coalbed methane and shale gas well	43
Service well	13 383
Suspended well	65 050
Abandoned well	160 929
<b>Total</b>	<b>423 025</b>

### Inspections

Table 7 shows the number of well site inspections from 2008 to 2012.

Table 7. Well site inspections

	2008	2009	2010	2011	2012
<b>Total</b>	9808	9983	6259	6095	3970

Of the 3970 well site inspections conducted in 2012, 88 were high risk noncompliant.

The most common reasons for high risk noncompliance were

- inadequate 24-hour emergency signage and/or lack of immediate emergency response,
- inadequate well suspension procedures, and
- inadequate containment and clean up of a spill or release.

### Incidents

Table 8 shows the number of well site incidents, including those reported for well servicing, from 2008 to 2012.

Table 8. Well site incidents

	2008	2009	2010	2011	2012
<b>Total</b>	600	520	526	567	619

Equipment failure, operator error, and inadequate procedures or design were the most common causes of these incidents.

## 2.3 Well Servicing

### Inspections

Table 9 shows the number of well servicing inspections from 2008 to 2012.

Table 9. Well servicing inspections conducted

	2008	2009	2010	2011	2012
<b>Total</b>	288	350	236	204	249

Of the 249 well servicing inspections conducted in 2012, 6 were high risk noncompliant. The most common reasons for high risk noncompliance were

- inadequate pressure testing,
- expired well servicing certification, and
- inadequate backup nitrogen systems.

## 2.4 Oil Facilities

### Inventory

Table 10 shows the 2012 oil facilities inventory. The 2011 inventory was 26 597.

Table 10. Licensed oil facilities

<b>Oil facilities</b>	
Crude oil single battery	11 959
Crude oil group battery	3 331
Crude bitumen single battery	1 367
Crude bitumen group battery	2 431
Crude bitumen paper battery	2 080
Other injection/disposal	901
Custom treating facility	37
Oil/bitumen satellite	5 767
<b>Total</b>	<b>27 873</b>

### Inspections

Table 11 shows the number of oil facilities inspections from 2008 to 2012.

Table 11. Oil facilities inspections

	2008	2009	2010	2011	2012
<b>Total</b>	3786	4698	3354	3200	4101

Of the 4101 oil facilities inspections conducted in 2012, 68 were high risk noncompliant. The most common reasons for high risk noncompliance were

- inadequate reporting of production and flared and vented gas volumes to PETRINEX (formerly the Petroleum Registry of Alberta),
- inadequate 24-hour emergency number signage and/or lack of immediate emergency response, and
- H<sub>2</sub>S off-lease odours.

### Incidents

Table 12 shows the number of incidents at oil facilities from 2008 to 2012.

Table 12. Oil facilities incidents

	2008	2009	2010	2011	2012
Total	404	356	321	363	347

Equipment failure, operator error, and inadequate procedures or design were the most common causes of these incidents.

## 2.5 Gas Facilities

### Inventory

Table 13 shows the 2012 gas facilities inventory. The 2011 inventory was 20 902.

Table 13. Licensed gas facilities

Gas facilities	
Gas single battery	9 855
Gas proration effluent battery	5 895
Gas test battery	3
Gas plant—sweet	522
Gas plant—acid gas flaring/Injection	203
Gas plant fraction—sour	3
Gas plant—sulphur recovery	40
Gas plant—straddle	9
Gas plant fraction—sweet	5
Compressor station	4 173
<b>Total</b>	<b>20 708</b>

## Inspections

Table 14 shows the number of gas facilities inspections from 2008 to 2012.

Table 14. Gas facilities inspections

	2008	2009	2010	2011	2012
<b>Total</b>	2005	3720	2325	2309	1974

Out of the 1974 gas facilities inspections conducted in 2012, 48 were high risk noncompliant. The most common reasons for high risk noncompliance were

- inadequate reporting of production and flared and vented gas volumes to PETRINEX,
- inadequate testing of underground tanks, and
- inadequate flaring programs.

## Incidents

Table 15 shows the number of gas facility incidents from 2008 to 2012.

Table 15. Gas facilities incidents

	2008	2009	2010	2011	2012
<b>Total</b>	101	80	79	90	79

Equipment failure, operator error, and inadequate procedures or design were the most common causes of these incidents.

## 2.6 Pipelines

### Inventory

Table 16 shows the 2012 pipeline inventory. The 2011 inventory was 406 974 km.

Table 16. Length of Alberta pipelines<sup>1</sup>

Pipeline type	Length (km)
Alberta Utilities Commission (AUC) natural gas utility pipelines <sup>2</sup>	11 476
Crude oil pipeline	20 272
Multiphase pipeline	61 576
Natural gas pipeline	238 582
Other pipeline	36 161
Sour gas pipeline	22 612
Water pipeline	24 473
<b>Total</b>	<b>415 152</b>

<sup>1</sup> Excludes National Energy Board (NEB) pipelines.

<sup>2</sup> The ERCB, through a memorandum of understanding, conducts surveillance and inspections, incident response, and failure investigations on natural gas utility pipelines regulated by the AUC.

## Inspections

Table 17 shows the number of pipeline inspections from 2008 to 2012.

Table 17. Pipeline inspections conducted

	2008	2009	2010	2011	2012
Total	1611	1602	1627	1457	1435

Of the 1435 pipeline inspections conducted in 2012, 174 were high risk noncompliant. Data collected from the 2012 pipeline inspections shows a slight increase in the rate of high risk noncompliance compared to 2011. As a result, focus will continue in this area in 2013. The most common reasons for high risk noncompliance were

- an industry operations and maintenance procedures manual not developed or not being followed,
- inadequate internal and external corrosion controls, and
- inadequate signage.

## Incidents

Table 18 shows the number of pipeline incidents<sup>3</sup> from 2008 to 2012.

Table 18. Pipeline incidents

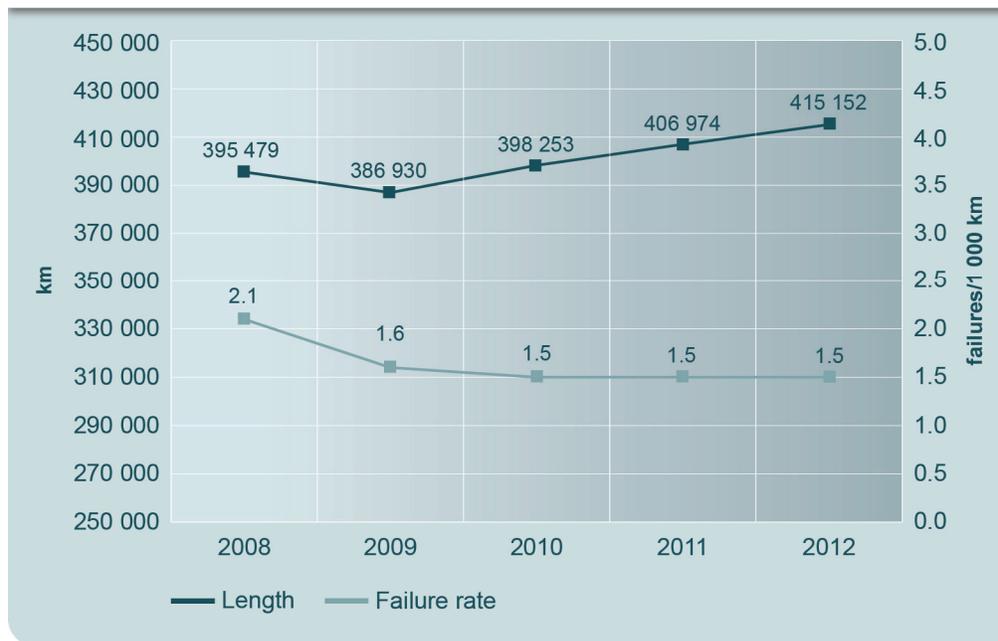
	2008	2009	2010	2011	2012
Total	976	737	687	717	699

The 699 pipeline incidents in 2012 were mainly caused by equipment failure, inadequate procedures or design, and third-party damage (i.e., damage by others).

Figure 4 shows the pipeline failure rate and pipeline length from 2008 to 2012. The length of pipeline under ERCB jurisdiction decreased in 2009 because of various pipeline transfers to National Energy Board jurisdiction.

<sup>3</sup> Pipeline incidents include pipeline failures (leaks and ruptures) and pipeline hits.

Figure 4. Pipeline length and failure rate



## 2.7 Drilling Waste

### Inspections

Table 19 shows the number of drilling waste inspections from 2008 to 2012.

Table 19. Drilling waste inspections

	2008	2009	2010	2011	2012
Total	138	187	134	145	155

Of the 155 drilling waste inspections conducted in 2012, 10 were high risk noncompliant.

The most common reasons for high risk noncompliance were

- inadequate disposal practices resulting in pooling, clumping, or erosion;
- inadequate sump location (porous/coarse soil); and
- failure to get landowner approval for off-site drilling waste disposal.

## 2.8 Waste Facilities

### Inventory

There were 112 active waste facilities in 2012, up from 106 in 2011. Waste facilities include

- waste storage and processing facilities,
- waste transfer stations,
- surface facilities associated with waste disposal wells,
- waste disposal wells (classes 1a and 1b),
- caverns,
- oilfield waste class 2 landfills,
- biodegradation facilities, and
- thermal treatment facilities.

### Inspections

Table 20 shows the number of waste facility inspections from 2008 to 2012.

Table 20. Waste facility inspections

	2008	2009	2010	2011	2012
Total	89	97	68	55	215

The number of waste facility inspections rose significantly to 215 in 2012 from 55 in 2011. This increase is primarily due to complaints and subsequent investigations and inspections associated with one facility located in northwestern Alberta.

There were no instances of high risk noncompliance found in waste facility inspections conducted in 2012.

## Appendix 1 Glossary

**Blowout**—An unintended flow of wellbore fluids (oil, gas, water, or other substance) at surface that cannot be controlled by existing wellhead and/or blowout prevention equipment, or flow from one formation to another formation (underground blowout) that cannot be controlled by increasing the fluid density. Control can only be regained by installing additional and/or replacing existing wellhead and/or blowout prevention equipment to allow shut-in or to permit the circulation of control fluids, or by drilling a relief well.

**Blowout preventer**—Equipment installed or that might be installed at the wellhead to control pressures and fluids during drilling, completion, and certain workover operations.

**Facility**—Any building, structure, installation, or equipment over which the ERCB has jurisdiction and that is associated with the recovery, development, production, handling, processing, treatment, or disposal of hydrocarbon-based resources or any associated substances or wastes. This does not include wells or pipelines.

**High risk noncompliance**—An event that represents an unacceptable level of risk not in accordance with an ERCB act, regulation, directive, or Board direction. In this instance, immediate mitigative measures must be taken. If the risk to health and safety, the environment, resource conservation, and/or stakeholder confidence in the regulatory process is more significant, the noncompliance is considered high risk. Examples of high risk noncompliance are off-lease H<sub>2</sub>S odours at an oil battery and failure to conduct blowout preventer tests at a drilling rig.

**Hit**—An incident in which a buried pipeline is struck during a ground disturbance activity resulting in the pipeline or pipeline coating being damaged; a release of product does not necessarily result.

**Hydrogen sulphide**—A naturally occurring gas that is found in various geological formations and that is also formed by the natural decomposition of organic matter in the absence of oxygen. H<sub>2</sub>S is colourless, has a molecular weight that is heavier than air, and is extremely toxic. In small concentrations, it has a rotten egg smell and causes eye and throat irritation.

**Incident**—An unexpected event that requires action by industry personnel to prevent or minimize the impacts on people, property, and the environment.

**Inspection category**—Describes an activity (e.g., drilling operations, oil and gas facilities, pipelines). Each inspection category contains a group of noncompliant events related to a specific activity or operation. The ERCB uses inspection categories to identify persistent noncompliance related to that activity or operation. For the list of inspection categories, go to the ERCB website [www.ercb.ca](http://www.ercb.ca).

**Leak**—The escape of substance from a pipeline in a manner that does not immediately impair the operation of the pipeline.

**PETRINEX**—A web-based system that provides management and exchange of volumetric, royalty, and commercial information associated with the upstream petroleum sector for the provinces of Alberta and Saskatchewan.

**Pipeline failure**—The failure of a pipeline to contain the substance being transported.

**Rupture**—A pipeline failure after which the pipeline is unable to continue operation.

**STICK diagram**—A well data information sheet specific to the drilling of a well.

**Sulphur dioxide**—A colourless, water-soluble, suffocating gas formed by burning sulphur in air; also used in the manufacture of sulphuric acid. SO<sub>2</sub> has a pungent smell similar to a burning match. SO<sub>2</sub> is extremely toxic at higher concentrations. The molecular weight of SO<sub>2</sub> is heavier than air; however, typical releases are related to combustion, which makes the gaseous mixture lighter than air (buoyant).

**Third-party damage**—Damage by others (third-party interference).