2010 British Columbia Public Safety Report



About the BC Oil and Gas Commission

The BC Oil and Gas Commission is an independent, single-window regulatory agency with responsibilities for overseeing oil and gas operations in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core roles include reviewing and assessing applications for industry activity, consulting with First Nations, ensuring industry complies with provincial legislation and cooperating with partner agencies. The public interest is protected through the objectives of ensuring public safety, protecting the environment, conserving petroleum resources and ensuring equitable participation in production.

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1 Executive Summary

A key priority of the BC Oil and Gas Commission

(Commission), as detailed in our mandate and expressed in our mission statement, is the protection of public safety. The purpose of this report is to provide statistics on public safety and performance measurements in an effort to demonstrate trends for continuous improvement

The 2010 Public Safety Report, covering the period of Jan. 1 to Dec. 31, is the first annual publication of reported incidents and complaints. Incidents and complaints related to oil and gas activities regulated by the Commission are recorded and tracked through the Commission's database. Incidents are reported to the Commission by industry, while complaints are reported by stakeholders and public.

In 2010, there was a total of 319 incidents reported to the Commission – 58 incidents related to pipelines, 163 related to wellsites, 83 related to facilities and 15 classified as other. Of all the reported incidents, the majority at 74 per cent were classified as the lowest rating of Minor. Next were Level 1 at 18.2 per cent and Level 2 at 7.2 per cent. Only two incidents

Incident	Incidents are reported to the Commission by industry and are received either directly or through the Provincial Emergency Pro- gram. Incidents are classified into four categories reflecting level of risk: Minor, Level 1, Level 2 and Level 3.
Complaint	Complaints are reported by the public and received through the Commission's 24-hour emer- gency telephone number. In this report complaints are classified into the following categories: pub- lic health, odours, environment, personal property, agriculture, safety, noise, flaring and other.

(0.6 per cent) were classified as Level 3. The Commission maintains a comprehensive Emergency Management Program to ensure permit holders plan for and respond to incidents appropriately and effectively.

The Commission received 191 complaints in 2010, and the majority of complaints were related to odours at 36.4 per cent. Environmental concerns were the second highest at 18.9 per cent. Complaints are important in helping the Commission reduce the risk of potential incidents. Complaints are received, tracked, and in most situations inspectors are dispatched to the location to determine the cause of the complaint and assist in resolving the situation if necessary.

The purpose of this report is to provide a summary of incidents and complaints over the course of each year, with the goal of improving performance and reducing similar, preventable events from happening in the future. The data used in the preparation of this report has been obtained from the Provincial Emergency Program (PEP) as well as the Commission's Knowledge, Enterprise, Resource, Management, Information Technology (KERMIT) data system. For the purpose of this report, oil and gas activities regulated by the Commission fall into four categories: pipelines, wellsites, facilities and other¹.

^{1 &}quot;Other" incidents for the purpose of this report are incidents that occurred during oil and gas activities such as road construction for leases, incidents occurring at camp sites, motor vehicle incidents, or incidents reported to the Commission anonymously by a third party but an investigation could not determine a source.

1.1 – Incident and Complaint Management

The Commission maintains an Emergency Management Program to ensure permit holders plan for and respond to incidents appropriately and effectively. The Commission plays an integral role in emergency management for oil and gas related activities, and its responsibilities include:

- Receiving reported incidents and complaints through the Commission's 24/7 service.
- Confirming the level of emergency response necessary by assessing potential risks.
- Ensuring permit holder notifies appropriate stakeholders and/or agencies.
- Overseeing of permit holders' response actions as per Commission requirements.
- Providing liaison with and coordinating interagency emergency operations.
- Providing regular situation updates to key stakeholders and response agencies.
- Authorizing official stand down of emergency response.

The permit holder is required to respond to all incidents appropriately and effectively, and is also responsible for all costs associated with response and remedial actions. Response actions may include, but are not limited to:

- Notification to Commission of all reportable incidents Level 1, 2, or 3 incidents to be reported within one hour; Minor to be reported within 24 hours.
- Notification to applicable stakeholders and government authorities.
- Control and containment of hazard(s).
- Roadblocks and/or closures to restrict public access.
- Air quality monitoring.
- Evacuating and/or sheltering the public.

Responding to complaints is a priority for the Commission and each complaint is addressed individually and accordingly. In most cases, inspectors are sent out to the location to determine the cause of the complaint and assist to resolve the situation. Complaints are important in helping reduce the risk of potential incidents, and the Commission commits to responding within two hours.

2 Regulated Activities

The regulatory responsibility of the Commission extends from exploration and development, to facility operation and through to site decommissioning and abandonment. Various departmental roles include assessing oil and gas activity applications and issuing approvals when appropriate, and ensuring industry compliance with legislative, regulatory and permit-specific requirements, in part through inspections and other monitoring and enforcement activities.

Within this report, oil and gas activities regulated by the Commission are broken down into four main categories: pipelines, wellsites, facilities (which include plants, stations and other surface installations) and other.

Pipelines refer to both underground and above ground pipelines, including risers. A pipeline is a continuous conduit between two geographical locations through which natural gas, oil, water, liquid natural gas or other gases/liquids associated with petroleum natural gas activities are transported under pressure. This includes gathering and transmission lines used to move oil and gas in oil and gas fields, water injection pipelines or other pipelines used to transmit water in oil and gas fields at pressures in excess of 3,500 kilopascals (kPa), and transmission lines used to transmit gas at pressures in excess of 700 kPa (gauge). The Commission is responsible for the regulatory oversight of the installation and operation for oil and gas related pipelines within British Columbia².

The category of wellsites includes drilling and completion wellsites, producing wellsites, injection wellsites, servicing wellsites and suspended wellsites. Wellsites and drilling refers to the process of drilling a well for the purpose of extracting underground petroleum products. It includes all operations that are continuously attended, from the time drilling commences to the production phase. Well completions and servicing refer to all operations that are continuously attended, subsequent to the drilling stage, that are necessary to prepare the well to produce, or after a period of production, to restore the well or to repair the well.

Facilities refer to a system, collection or arrangement of equipment situated at a single location used for the production, processing or transportation of oil or natural gas. This includes compressor stations, oil pump stations, processing plants and batteries. The Commission has the regulatory oversight for construction and operation of oil and gas related facilities in British Columbia³, except refineries and tank farms (storage).

² A portion of British Columbia's pipelines, such as cross-border pipelines, are regulated by the National Energy Board. 3 A portion of British Columbia's facilities are regulated by the National Energy Board.



3 Incident Summary

Incidents are reported to the Commission directly to an Emergency Officer by industry or through PEP, and are then entered into the KERMIT database. Upon being reported, incidents are classified into four categories reflecting the level of risk: Minor, Level 1, Level 2 or Level 3:

Minor: Incidents that do not meet the criteria for Levels 1-3. Incident has impact on permit holder only, and no potential impacts to people, property or the environment.
Level 1: Incident has moderate to major impact on permit holder only; no potential impacts to people, property or environment.

• Level 2: Incident may pose a major risk to the public and/or environment.

• Level 3: Incident has serious impacts to the public and/or environment and results in immediate danger.

Cause factors for incidents are classified by the Commission and in KERMIT as (although in some cases factors can be unknown at the time of the incident):

- Third party.
- Corrosion.
- Over-pressurized equipment.
- Geological.
- Manufacturing defect.
- Human error.
- · Equipment failure.
- Other factors⁴.

For each incident, one or more factors can contribute to the cause of to the incident. Types of factors are:

- Hazardous material spill or release.
- Fire or explosion.
- Structural or equipment damage.
- Natural events, such as floods, wildfires or storms.
- Security threats, such as sabotage, vandalism or terrorism.
- Worker fatality or serious injury.
- Other, which are defined by rare or unusual events.

The Commission strives to ensure incidents are remediated as quickly as practicable to prevent unnecessary escalation. When incidents are reported, the response actions are reported to the Commission and recorded in the database. Depending on the severity of the incident, the Commission is continually updated during an event. This is particularly important for Level 1, 2 and 3 incidents.

4 Other factors include sand erosion, loss of circulation while drilling and well communications.

3.1 Reported Incidents

In 2010, there were a total of 319 incidents reported to the Commission – 58 incidents related to pipelines, 163 related to wellsites, 83 related to facilities and 15 classified as other. Table 1 shows a breakdown of the incidents for each activity.

Table 1 - Reported incidents by activity type in 2010

Activity Type	Number of Reported Incidents
Pipelines	58
Wellsites (Producing)	73
Wellsites (Drilling/Completion)	82
Wellsites (Other)	8
Facilities	83
Other	15
Total	319

Wellsite related incidents made up nearly half of the total reported incidents, accounting for 51.1 per cent. Of that, 44.8 per cent were related to producing wellsites, 50.3 per cent to drilling/ completions activities, and 4.9 per cent involved other wellsite activities such as servicing, injection wellsites, disposal sites and suspended wellsites. Facility related incidents accounted for 26 per cent of reported incidents, pipelines for 18.2 per cent and other accounted for 4.7 per cent.

Of all reported incidents, 74 per cent were classified as Minor status. Level 1 incidents were the second most classification at 18.2 per cent, while 7.2 per cent were Level 2 and 0.6 per cent were Level 3. Table 2 shows the number of incidents based on the threat level as Minor, Level 1, Level 2 or Level 3.

Table 2 - Total reported incidents classified by threat level

Threat Level	Number of Reported Incidents
Minor	236
Level 1	58
Level 2	23
Level 3	2
Total	319

The contributing factors or causes for reported incidents include third party, corrosion, overpressurized equipment, geological factors, human error, equipment failure, other factors and unknown. Figure 1 shows a breakdown of the contributing causes for all reported incidents. The Commission records the type of material(s) released, if any, for incidents which involve releases or spills. The Commission notes that best practices are in place to prevent spills and releases and ensure applicable regulations are followed; in the event of a spill or release, the Commission ensures that Emergency Response Plans are implemented to mitigate the risk to public safety and the environment.

Miscellaneous liquids made up the majority of material type for incidents that involved a spill or release. These can include corrosion inhibitor, drilling fluids and various chemicals and hydrocarbon mixtures. Miscellaneous gases – accounting for three out of 319 incidents – include hydrocarbon gases such as propane, nitrogen, and mixtures of gases. Multiphase, accounting for 14 incidents, include releases of fluids in multiple phases such as a gas and liquid, but do not include emulsions. Furthermore, of the 319 reported incidents, 36 were natural gas releases, 26 were sour natural gas releases and 13 did not involve any release.

Figure 1 – Contributing causes to reported incidents in 2010





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4 Pipelines

The Commission regulates pipeline activities ranging from pipeline construction to pipeline operation and maintenance. Pipeline activities are regulated by the Pipeline Regulation, which states that all pipelines must be operated and maintained in accordance with CSA Z662–Oil and Gas Pipeline Systems. Included in the statistics are pipelines that are no longer in service or those that have been appropriately deactivated and abandoned.

4.1 Incidents

The Commission received notification of 58 pipeline incidents in 2010. Table 3 shows the number of pipeline incidents classified as Minor, Level 1, 2 and 3. Minor status and Level 1 incidents accounted for 37 and 13 of the total pipeline incidents reported, respectively. Level 2 accounted for seven and there was one Level 3.

Table 3 – Pipeline incidents based on threat level

Threat Level	Number of Reported Pipeline Incidents
Minor	37
Level 1	13
Level 2	7
Level 3	1
Total	58

The majority of pipeline incidents resulted from equipment failure, which accounted for 31.2 per cent (Figure 3). Human error contributed to 20.8 per cent of incident causes. Corrosion, which includes internal and external corrosion, contributed to 16.9 per cent. Third party incidents, which involved mostly pipeline strikes, contributed to 10.4 per cent. Geological and other factors each accounted for 7.8 per cent, while 3.9 per cent of causes were unknown. Over-pressurized equipment accounted for 1.3 per cent.

At 17 per cent, miscellaneous liquids were involved in the most pipeline incidents (Figure 4). The second most involved materials at 14 per cent each were natural gas and emulsion, as well as incidents that released no material. Other materials released included fresh water, produced water, condensate, miscellaneous gases, multiphase and sour natural gas.

There was one Level 3 incident that occurred in 2010 caused by a third party in which an equipment operator struck a pipeline causing a 141,581 m³ natural gas release. This incident involved evacuation of the area by the local fire department and road closures.

Figure 3 - Contributing causes to pipeline incidents



Figure 4 – Material released for all pipeline incidents



5 Wellsites

Wellsite activities are regulated by the Drilling and Production Regulation. Included in these statistics are wellsites that have been suspended and one disposal well. There were no incidents that involved abandoned wells.

7.1 Incidents

The Commission received 163 wellsite incidents in 2010. Table 4 shows the number of wellsite incidents classified as Minor or Level 1, 2 and 3.

Table 4 – Wellsite incidents by Level of Risk

Threat Level	Wellsite		
	Producing	Drilling/Completion	Other
Minor	50	58	6
Level 1	11	22	2
Level 2	12	1	0
Level 3	0	1	0
Total	73	82	8

The wellsite incidents are broken down into incidents related to producing wellsites, drilling and completions wellsites, injection or disposal wellsites and other wellsite activities such as well servicing. Of the three categories of wellsites, drilling and completion sites contributed to the most incidents reported with a total of 82.

Producing wellsites had 73 incidents and the other classified wellsites had eight reported incidents. Producing wellsites had a similar number of Level 1 and Level 2 incidents being 11 and 12, respectively. Drilling and completions had 58 Minor incidents and 22 Level 1 incidents. Finally, other wellsites had six Minor incidents and two Level 1.

The types of materials spilled or released in wellsite incidents ranged from produced water, emulsion, natural gas and miscellaneous liquids such as drilling mud, corrosion inhibitor and glycols. Figure 5 shows a breakdown of the types of materials spilled or released. The factors contributing to producing and drilling/completion wellsite incidents are shown in Figures 6.1 and 6.2.

One Level 3 incident occurred on a drilling rig when an unknown amount of natural gas was released resulting in a fire that subsequently destroyed most of the equipment on location.



Figure 5 - Material released for all wellsite spills, incident notifications and emergencies



6.1 Producing



6.2 Drilling/Completion



Equipment failure was the leading cause for all wellsite incidents, representing 44.7 per cent of the total. The same is true for each wellsite category – 64.5 per cent for producing wellsites, 30 per cent for drilling and completions wellsites and 54.5 per cent for other wellsites.

For producing wellsites, the second leading cause was human error, followed by other factors, corrosion, unknown and third party. For drilling and completion wells, other factors were the second leading cause at 28.2 per cent, which included well kicks, well communication and lost circulation. These were followed by geological, human error, over-pressurized equipment and unknown. For other wellsites, the second leading cause was human error at 45.5 per cent.



6 Facilities

Facilities regulated by the Commission include compressor stations, oil batteries, small tank farms and gas processing plants. Construction, operation and maintenance of facilities follow the Drilling and Production Regulation as well as ASME B31.3 standards.

8.1 Incidents

Eighty-three facility incidents were reported to the Commission in 2010. Table 5 shows the number of facility incidents classified as Minor or Level 1, 2 and 3.

Table 5 – Facility incidents based on threat level

Threat Level	Number of Reported Facility Incidents
Minor	72
Level 1	8
Level 2	3
Level 3	0
Total	83

Similar to pipeline and wellsite incidents, the majority of facility incidents were related to Minor status incidents at 72. There were eight Level 1 incidents and three Level 2 incidents. These reported incidents involved material spills or releases including produced water, crude oil, condensate, emulsion, methanol, natural gas, sour natural gas and miscellaneous liquids such as coolant, glycol mixtures and corrosion inhibitor. Figure 7 (next page) shows a breakdown of the types of material released. The causes contributing to facility incidents are shown in Figure 8.

Similar to the pipeline and wellsite trends, equipment failure was the number one cause factor, accounting for 58.9 per cent. Human error accounted for 18.9 per cent of cause factors. Corrosion, both internal and external, accounted for 10 per cent of cause factors. Unknown factors accounted for 5.6 per cent. Other factors accounted for 4.4 per cent, and third party factors accounted for 2.2 per cent.

Figure 7 - Material released for all facility incidents



Figure 8 - Contributing causes to facility incidents



7 Other

There were incidents reported to the Commission in 2010 that do not fall under the category of pipeline, wellsite or facility. These incidents occurred during oil and gas activities such as road construction for leases, incidents occurring at camp sites, motor vehicle incidents, or incidents reported to the Commission anonymously by a third party but investigation could not determine a source.

9.1 Incidents

A total of 15 incidents were reported to the Commission relating to other oil and gas activities in 2010. Table 6 shows the number of incidents classified as Minor, Level 1, 2 or 3.

Table 6 - Other incidents based on threat level

Threat Level	Number of Other Reported Incidents
Minor	13
Level 1	2
Level 2	0
Level 3	0
Total	15

Similar to the pipelines, wellsites and facilities, Minor incidents made up the majority at 13 of the 15 incidents reported to the Commission. There were two Level 1 and no Level 2 or 3 incidents. The types of material spilled or released included carbon dioxide, diesel fuel, crude oil and miscellaneous liquids such as antifreeze, ethylene glycol, engine coolant and sewage waste. Figure 8 shows a breakdown of the types of material. The cause factors contributing to these other incidents are shown in Figure 9.

Equipment failure and human error were the leading causes for all other incidents, both making up 43.7 per cent, or 87.4 per cent of the total. The remainder were third party and other factors which accounted for 12.6 per cent of the total.

Figure 9 – Material released for all other incidents



Figure 10 - Contributing causes to other incidents



8 Complaints Summary

The Commission tracks all reported complaints received through the 24-hour emergency phone number. In this report, complaints are classified into the following affected categories: Public Health, Odours, Environment, Personal Property, Agriculture, Safety, Noise, Flaring and Other. The complaints reported can affect more than one of the mentioned categories.

Odour complaints may include any type of odour; noise complaints are from various sources but primarily from equipment use; flaring complaints are generally related to disturbances and/or potential pollution caused by flaring; agricultural complaints are specifically related to land, crops or animal issues; safety complaints include any issues which may potentially impact public safety, such as unsafe road conditions or unsafe work practices and other complaints refer to those that do not fit into the aforementioned categories.

The Commission received 191 complaints in 2010. A breakdown of the number of complaints reported in each month is shown in Table 7.

Table 7 – Complaints by month in 2010

Month	Number of Complaints
January	11
February	25
March	19
April	12
Мау	16
June	11
July	6
August	20
September	14
October	20
November	17
December	20
Total	191

The most complaints received by the Commission occurred in February at 25. Next were August, October and December with 20 each month. March had the next highest at 19 complaints. The fewest number of complaints occurred in July (six). Figure 11 shows the classification of the total reported complaints.

Figure 11 - Classification of total reported complaints in 2010



The majority of the complaints involved odours, accounting for 36.4 per cent. Complaints of environmental concerns were the second highest at 18.9 per cent and can include black smoke emissions from flaring, gas plumes, potentially contaminated soils and waste disposals on site. Also 14 per cent of complaints related to flaring, and can include perceived excessive flaring and/or emissions from flaring. Noise concerns from drilling sites, compressor stations and other random loud noises from sites contributed to 8.3 per cent of all complaints. Complaints potentially impacting agricultural, which can include reported excessive use of timber, activities affecting or contaminating mineral licks for wildlife, soil contamination and broken beaver dams, accounted for 7.9 per cent. Personal property concerns, which can include reported contamination on private property, unsatisfied remediation of private land and activities occurring without landowner consent, accounted for seven per cent. Safety concerns, which can include unfenced wellsites and pits, sites with unlocked gates and potential road damage from construction activities, accounted for 3.5 per cent. Public health complaints can include concerns about emissions from flaring, strong odours and poor air quality and accounted for 3.1 per cent. There were two other complaints that made up 0.9 per cent of the total.

11.1 Complaint Response

The Commission prioritizes complaints and strives to address each complaint accordingly. Inspectors are sent out to each location to determine the cause of the complaint and assist to resolve the situation. Complaints are important in helping reduce the risk of potential incidents, and the Commission commits to responding within two hours.

9 Compliance and Enforcement

The Commission's compliance and enforcement division ensures that industry complies with provincial legislation and cooperates with partner agencies. Regulatory compliance starts as soon as an application for industrial activity is submitted. Once an application is approved and construction commences, the Commission's inspection staff monitors regulatory compliance.

The Commission's inspectors undertake reviews generated by risk modelling, complaints, incidents and government agency or public requests to ensure operators are in compliance with all applicable legislation, standards and approval conditions. Risk modelling ensures that the highest risk sites are inspected, and they are ranked by the operator's compliance history, site proximity to residents and/or sensitive environments and the probability of an incident occurring along with the potential consequences. Compliance inspections are conducted to prevent incidents from occurring, thereby mitigating risks to public safety.

Site inspections are also triggered through public requests and complaints. Public complaints are regarded as a priority and the Commission's goal is to respond to every complaint within 24 hours. Emergency situations are dealt with as soon as possible, usually within two hours. The Commission has a designated on-call Emergency Officer to take all calls of incidents and complaints. If the Emergency Officer cannot be reached within 10 minutes, there is an emergency call down list of contacts.

Inspection findings are entered into the Commission's database and deficiencies are identified. In situations where an operator fails to meet requirements or follow Commission direction, the operator may be subject to measures imposed by the Commission's enforcement officers or their counterparts within other authorities and arms of government.

10 Conclusion

This first annual report provides a factual and informative basis for the ongoing reporting of public safety complaints and incidents as received by the Commission. One important aspect of mitigating public safety risks and ensuring the safest, best practices are followed is having a transparent and accurate data summary available internally and to stakeholders.

The Commisson takes complaints seriously and responds to them on an individual basis. In the event of an emergency, comprehensive Emergency Management processes are followed and effective responses are ensured through Emergency Officers, and followed up on by our compliance and enforcement division.

A key priority of the Commission, as detailed in our mandate and expressed in our mission statement, is the protection of public safety and respecting those who may be affected by oil and gas activity. Moving forward, the Commission commits to being transparent in terms of complaints and incidents and working with all stakeholders to ensure resource development is done safely for the benefit of all British Columbians.

We welcome your comments on this report as well as suggestions to improve future reporting.



Appendix 1 – Glossary

• **Pipeline**: continuous conduit between two geographical locations through which oil, gas or solids is transported under pressure, and includes:

• A company pipeline.

• All gathering and flow lines used in oil and gas fields to transmit oil and gas.

• All water injection pipelines or other pipelines used to transmit water at working pressures in excess of 3,500 kilopascals (kPa) in oil and gas fields.

• All transmission lines used to transmit gas at working pressures in excess of 700 kPa (gauge) from a company pipeline to the distribution system of a public utility or a gas utility.

• The majority of pipelines in British Columbia are regulated by the Commission; however, inter-provincial pipelines are regulated by the National Energy Board.

• **Drilling**: includes all operations that are continuously attended, from spudding-in until production casing is cemented or the well is abandoned.

• **Completion/Servicing**: includes all operations that are continuously attended subsequent to the drilling stage and, which are necessary to prepare the well to produce, or after a period of production, to restore the well or to repair the well.

• Producing Well: wells that have been completed and are currently placed on regular production.

• **Suspended Well**: includes all operations, which are not continuously attended, at wells that are not capable of producing.

• Facility: a system, collection, or arrangement of equipment situated at a single location used for the production, processing, or transportation of oil or natural gas. This includes compressor stations, oil pump stations, processing plants and batteries. The majority of facilities in British Columbia are permitted and regulated by the Commisson, but some are under the National Energy Board's jurisdiction.

• **Spill**: Incident resulting from the release of a product or substance which potentially impacts public safety, property or the environment.

• **Minor**: Incidents that do not meet the criteria for Levels 1-3. Incident has impact on permit holder only, and no potential impacts to people, property or the environment.

• Level 1: Incident has moderate to major impact on permit holder only; no potential impacts to people, property or environment.

• Level 2: Incident may pose a major risk to the public and/or environment.

• Level 3: Incident has serious impacts to the public and/or environment and results in immediate danger.