BC Oil & Gas COMMISSION

Flaring, Incinerating and Venting Reduction Annual Report

September 2009

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Introduction

The BC Oil and Gas Commission (Commission) is an independent regulatory agency charged with overseeing oil and gas activities including exploration, development, pipeline transportation and reclamation. The Commission balances a diverse range of environmental, economic and social considerations, while focusing on the conservation of petroleum resources and protection of the environment for the benefit of all British Columbians.

In early 2007, the Province of British Columbia announced the BC Energy Plan, situating the province at the forefront of environmental and economic leadership. The Plan commits to the elimination of all routine flaring at oil and gas producing wells and production facilities by 2016 with an interim goal to cut flaring in half by 2011.

In March, 2008 the Commission's Flaring, Incinerating and Venting Reduction Guideline for British Columbia (Guideline) came into effect. With natural gas conservation a key objective, the Guideline provides regulatory requirements for flaring, incinerating, and venting at any well site, facility and pipeline regulated under the *Petroleum and Natural Gas Act* and *Pipeline Act* in British Columbia.

This report is the first annual report on progress made collaboratively with stakeholders, industry, regulatory agencies and government with respect to meeting the objectives of reducing and eliminating flaring, incineration and venting in the Province of British Columbia. While this report and the Guideline speak to all flaring, incineration and venting sources, information is provided specifically addressing progress made towards the Energy Plan reduction targets.

Highlights

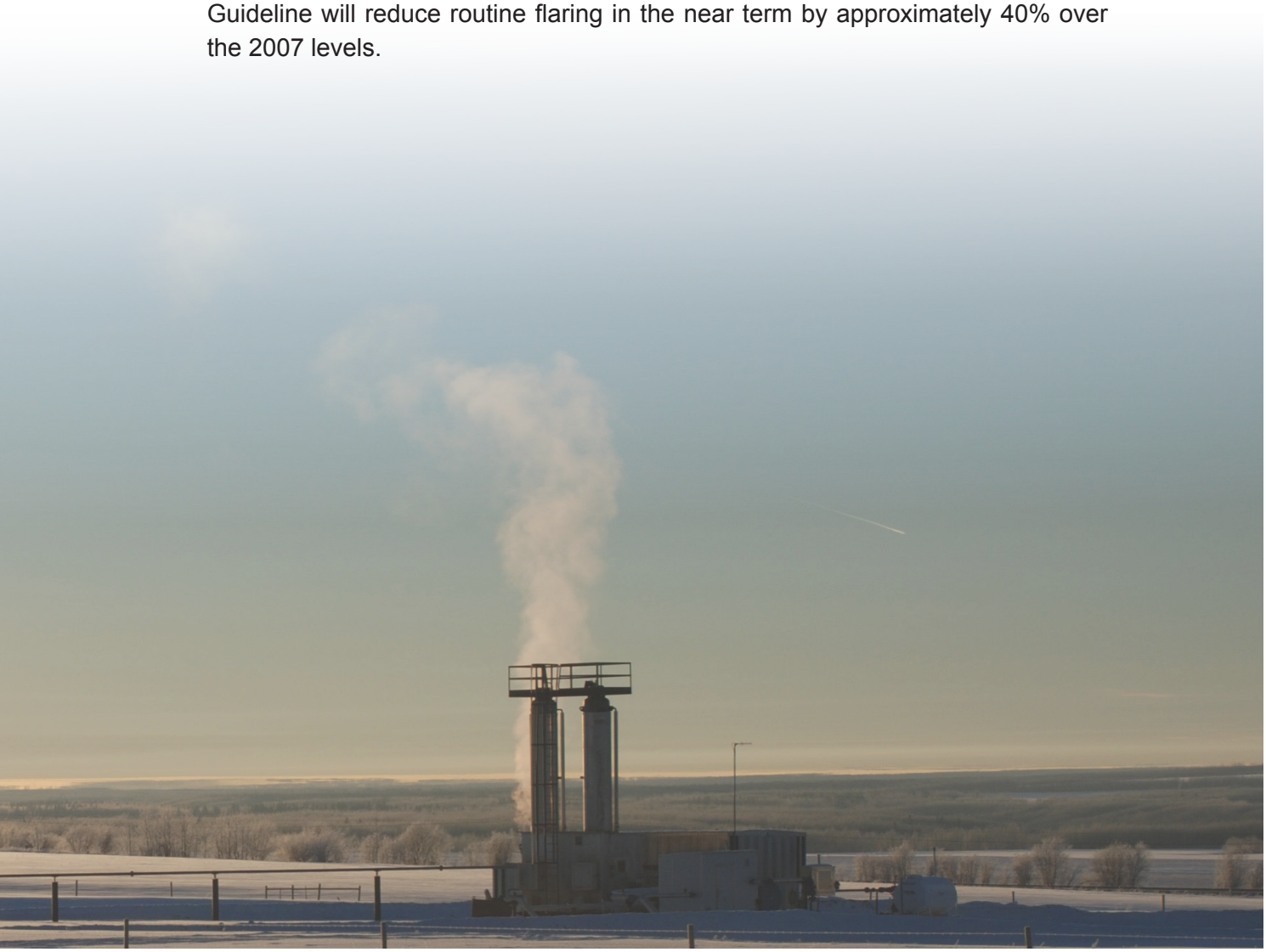
There has been a reduction of 26.5% in solution gas flaring since the beginning of 2007. British Columbia has seen an 85% decline in volume of solution gas flaring since 1997.

97% of solution gas is currently conserved.

Industry has achieved a 19% reduction in annual flare volumes since 1996.

The Commission has introduced a number of process changes to promote conservation of gas through the use of new technology and through the permitting of temporary pipelines.

The requirements in the 2008 Flaring, Incinerating and Venting Reduction Guideline will reduce routine flaring in the near term by approximately 40% over the 2007 levels.



Flaring, Incinerating and Venting

Flaring is used as a method of disposal for combustible gases associated with petroleum and natural gas production, processing and transportation. Flaring may occur at a well site during well testing and completion where the well is allowed to flow and there is no means of gas conservation in place. Flaring at a well site may also occurr continuously where the well is designed for the production of oil or other liquid hydrocarbons and where some gas is produced along with the liquids. This gas is referred to as solution gas. At facilities such as gas plants and during under-balanced drilling, flaring is typically used for gas disposal when pressure upsets occur.

Incinerating is the combustion of natural gas mixed with air at a controlled rate in a chamber designed to ignite and burn the gas with no visible flame above the unit. For the purposes of natural gas management and disposition reporting, incinerated gas must be reported as flared. Combustion of natural gas in incinerators is not considered an alternative to conservation.

Some flare stacks contain a fan at the base that induces extra atmospheric air, producing greater combustion making the flare a more efficient burn, resulting in less emissions to the atmosphere.

Venting is the intentional controlled release of un-combusted gas to atmosphere, without flaring or incinerating. The practice is restricted primarily to gas streams that do not support stable combustion.

The Commission does not consider venting as an acceptable alternative to flaring.

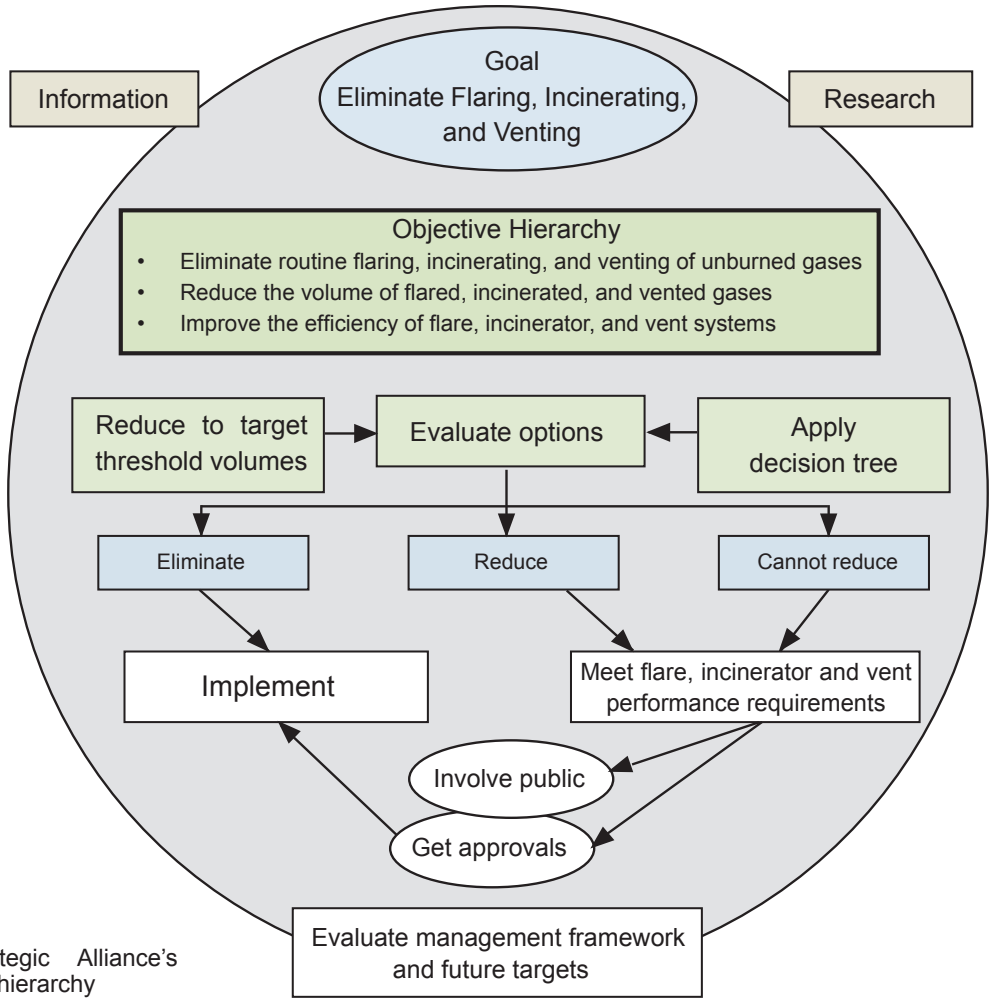
Conservation is defined as the recovery of natural gas - mainly utilized for sale. The gas can also be used as fuel for production facilities and for other useful purposes, such as power generation and beneficial injection into an oil or gas pool (e.g., pressure maintenance and enhanced oil recovery).

Management and Conservation

The Commission is committed to the ongoing development and support of an innovative and efficient regulatory framework for all oil and gas activities in British Columbia. As a Crown Corporation, the Commission is granted authority to regulate oil and gas activity by means of provincial legislation including the *Petroleum and Natural Gas Act*, the *Pipeline Act* and the *Oil and Gas Commission Act.*

Within the Commission's mandate of supporting regulatory enhancements, relationships with partner ministries and agencies continue to evolve. This is reflected in numerous delegated authorities and Memorandums of Understanding. These efficient collaborations are reflected in the development, implementation and communication of harmonized environmental requirements targeting the reduction or elimination of flaring, incinerating and venting.

The Commission is an active participant in the Canadian Flaring and Venting Regulators Forum. Through avenues such as this, the Commission is able to examine the practices of other jurisdictions and adopt those which are most beneficial to British Columbians. As an example, the Commisison endorses the recommended strategies of the Clean Air Strategic Alliance's (CASA) objective hierarchy and framework for management of all sources of gas flaring, incinerating and venting.

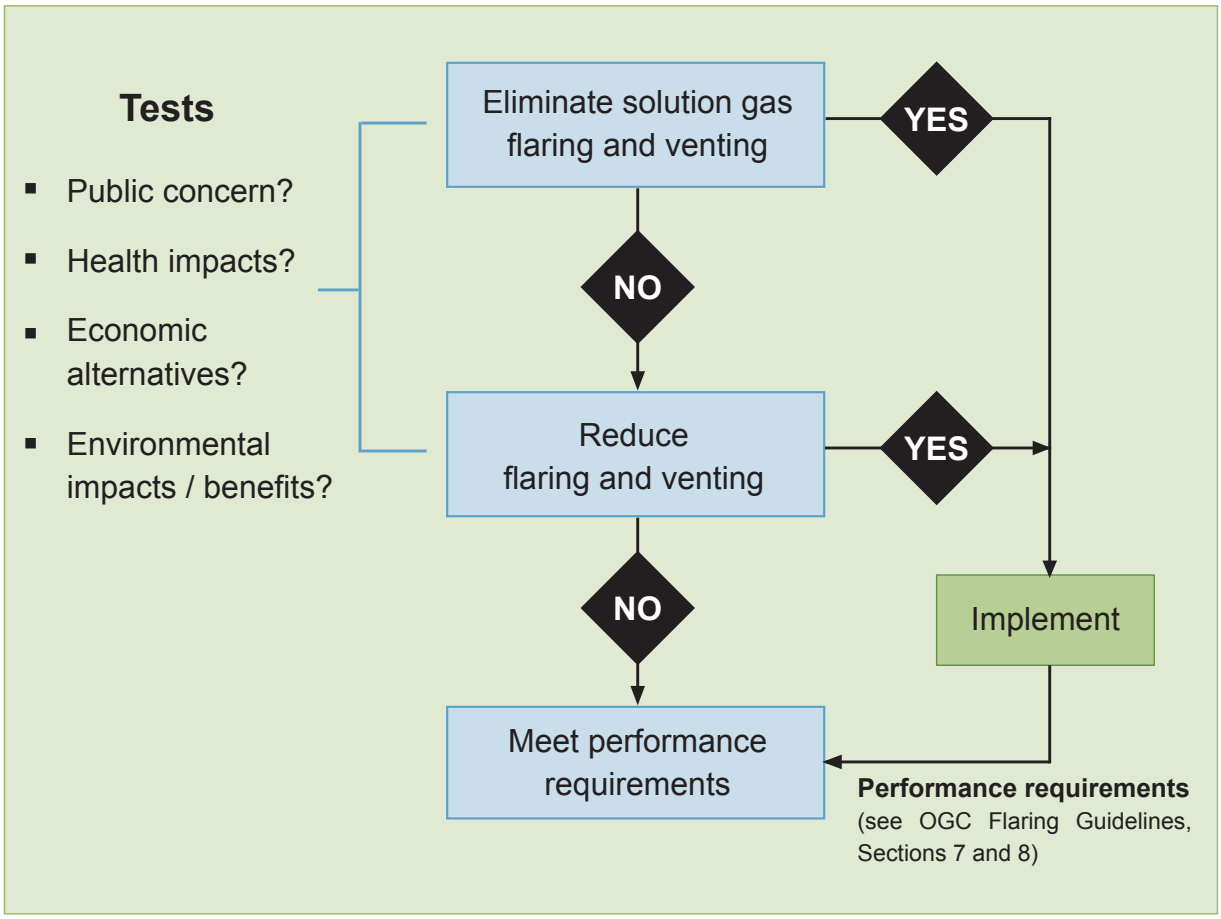


Clean Air Strategic Alliance's (CASA) objective hierarchy

In accordance with the clear and consistent expectations of the objective hierarchy, operators must evaluate three options:

1. Can flaring, incinerating, and venting be eliminated?
2. Can flaring, incinerating, and venting be reduced?
3. Will flaring, incinerating, and venting meet performance standards?

Also adapted from CASA for Commission and Industry use is the Solution Gas Flaring/Venting Decision Tree. This decision support tool uses a tree-like graph to demonstrate how each element is to be considered and, where appropriate, implemented.



The Commission supports this decision process. Operators must apply the decision tree to all solution gas flares and vents greater than 900m^3/day.

In referring to these three options, industry considers more than just economics - they consider the public, the environment, and the interests of the people of British Columbia as reflected in the first goal of the Commission.

The above interests are pursued at the earliest stages of the application process, ensuring legislative requirements and stakeholder concerns have been taken into account.

Resource Conservation

There are five major sources of flaring. These are:

1. Solution Gas
2. Well Clean Up and Testing
3. Production Facilities
4. Underbalanced Drilling
5. Gas Processing Plants

Solution Gas

Solution gas flaring is flaring that occurs predominantly at oil producing wells and oil batteries.

The Guideline has defined a threshold of 900m^3/day per site for evaluating the economics of gas conservation. Operators are required to conserve solution gas at sites where economic analysis indicates NPV of -$50,000 (negative $50,000). All economic analysis of associated gas flaring must be conducted in accordance with standard criteria set out in the Guideline.

$$NPV = \sum_{t-1}^{T} \frac{C_t}{(1 + r)^t} - C_o$$

Net Present Value (NPV) is defined as the total present value (PV) of a time series of cash flows.

One large project that will result in significant reductions in solution gas flaring was undertaken by Harvest Energy Trust. In 2008, Harvest started up a gas facility to capture and sell solution gas, resulting in an estimated annual reduction of 2.0 10^6 m^3 of solution gas flaring at the site. Harvest will be installing a Vapour Recover Unit in early 2009 to capture the majority of remaining low pressure flared gas, allowing a further reduction of 1.6 10^6 m^3. Construction of the gas facility also allowed Harvest to connect their facilities to the BC Hydro electrical grid, removing the need to burn lease fuel to generate on-site electricity, further reducing emissions at the site.

Operators are required to conserve solution gas when flared volumes are greater than 900m^3/day per site and the flare is within 500 metres of an existing residence. This is in addition to the economic evaluation criteria.

Over the long term, the Commission expects an overall improvement in total gas utilization, particularly with regard to solution gas. The Commission is targeting a minimum of 97% conservation of solution gas by 2011 and 98% by 2016.

Well Clean Up and Testing

Well cleanup and well test flaring is conducted once a well is completed, as well as prior to placing the well on production. Well cleanup flaring involves flowing the well to remove constituents introduced during stimulation operations that are not suitable for introduction into a pipeline.

Well testing also involves flowing a well so pressure and flow data may be collected. The data is used in mathematical models to predict reservoir behavior and to estimate reservoir parameters including reserves estimates and expected flowrates. This data is used for economic analysis and engineering design to determine if sufficient gas supply justifies related investments in pipelines and facilities.

The Commission has implemented effective initiatives minimizing volumes of gas flared during well test and clean up tests.

The Guideline sets three volume thresholds for gas well cleanup and test flaring. These include:

- 600 10^3 m^3 for exploratory wells,
- 400 10^3 m^3 for development wells, and
- 200 10^3 m^3 for wells that have been tied into a facility that is designed to handle production from the formation (i.e., a producing well).

An incremental allowance of 200 10^3 m^3 can be added to the volume allowance threshold where multiple geological zones are completed. For example, during the completions process a development well entitled to 400 10^3 m^3 combining the Montney and Doig formations could be permitted to flare up to 600 10^3 m^3 by submitting a flaring notification. However, after submitting a flaring notification operators must be able to justify flared volumes even if they are below the guideline thresholds.

Additional flare volumes may be granted to operators where sufficient cleanup of the well can not be completed within the volume allowance threshold, or where a well test is required. Approval for well test flaring may also be granted where the evaluation of completion technique indicates that tests cannot be conducted inline. Again, thresholds apply in each case.

The Commission requires operators to define the cleanup endpoint (i.e., sand content, CO_2 content, water-gas ratio) when applying for flaring approval. The flaring approval is then written with a condition to cease flaring when the cleanup is completed. For example, an operator with a well in the Montney applied for 1600 10^3 m^3 of gas for cleanup flaring. Instead of limiting the flared volume, conditions were attached to the permit to cease flaring and flow inline when predetermined CO_2 and sand content thresholds had been reached with progress updates provided to the Commission. The resulting well flared volume was reduced to 350 10^3 m^3, or close to a 75% reduction.

The Commission works with operators to determine completion techniques ensuring minimal flaring. In one instance, an operator requested large flare volumes in the range of 1500 - 1800 10^3 m^3 to achieve cleanup on their wells. The Commission deemed this excessive and challenged the operator to employ a different stimulating technique. The new technique decreased clean up volumes by more than 50% of the requested amount to about 600 10^3 m^3. In 2009, this operator will have sufficient infrastructure in place to allow a majority of their wells to be cleaned up and tested inline, reducing flare volumes to near zero.

Production Facility Changes

In the year since the Guideline was brought into effect, the Commission has worked with operators on production facility designs, ensuring all reasonable options are considered in an effort to eliminate or reduce flaring. As a result, numerous engineering technologies and other provisions have allowed for further incorporation of flaring and venting reduction options. Where conservation is possible, the Commission's ultimate goal is to approve applications that conserve gas.

Significant reductions in volumes of gas flared at three Devon Canada facilities near Fort St. John were the result of engineering design changes. This included the installation of improved flare stack technology to reduce flare volumes, and

modifications to an existing vapour recovery system at one facility. Another strategy being considered is installing flash tanks between separators and storage tanks to capture solution gas before the fluids enter storage.

Penn West has also been measuring volumes of gas flared at facilities and has completed initial equipment changes that have reduced volumes flared by 90% at a facility near Fort St. John.

In the Tomslake area, EnCana is installing pressurized storage tanks at all major facilities to reduce volumes of gas flared. They are planning to install a vapor recovery unit (VRU) at their Swan compressor facility located near Tupper Highway #2 to capture and conserve gas currently being flared.

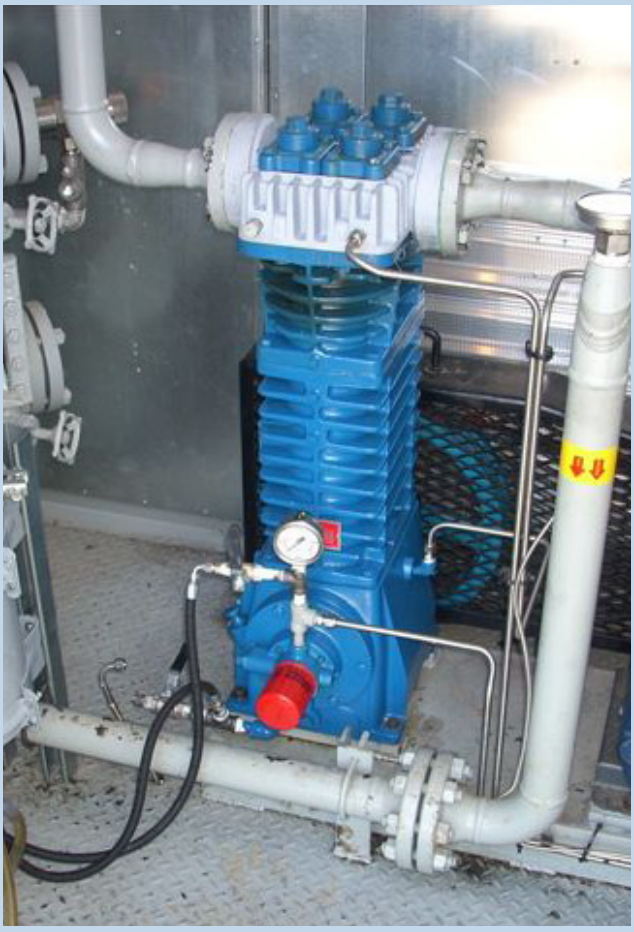
In the Farmington area, Pienza Petroleum and Huron Energy are planning to install VRUs at their main facilities where they currently flare solution gas off production tanks. If applicable, all new facilities in the area will be engineered in a similar manner.

VRUs have also been installed by Progress Energy, at their Bernadet facility, and Pengrowth Energy, at two of their large oil batteries north of Fort St. John. Prior to the VRUs being in place, gas was flared or vented to atmosphere. These improvements are early outcomes of the facility flare reduction project that should significantly increase gas conservation, while decreasing the visible impact of flares.

Industry is now utilizing solar powered equipment, such as pumps at single well facilities. Terra Energy almost exclusively install solar powered equipment to power small pumps at new facilities rather than using propane or natural gas, eliminating the need to burn or vent gas.

Another technological advance is being tested in new facility applications. Solution gas is being used to drive electrical generators to power equipment at remote facilities. Flare stack designs are changing to reduce pilot and purge gas volume requirements.

The Commission encourages the use of new engineered innovations to minimize flaring and venting.



Vapour Recovery Unit (VRU): a unit composed of a scrubber, a compressor and a switch. The VRUs main purpose is to recover and condense vapours formed inside tanks. The switch detects pressure variations, in turn switching the compressor on and off. Vapours are drawn through the scrubber, where the liquid is trapped and returned to the liquid pipelines system or the tank, and the vapour recovered is pumped into gas lines.

Underbalanced Drilling

Underbalanced Drilling (UBD) is a procedure used to drill oil and gas wells where wellbore pressure is kept lower than fluid pressure in the formation being drilled. As the well is being drilled, formation fluid flows into the wellbore and up to the surface. This is the opposite of the usual situation, where the wellbore is kept at a pressure above the formation to prevent formation fluid entering.

One of the primary advantages of UBD is that, due to the reduced hydrostatic pressure in the well, drilling mud does not invade the formation and cause formation damage. Depending on the reservoir properties, formation damage may permanently impair the productivity of a well.

Traditionally, UBD has allowed for little flexibility in reducing the amount of flaring due to the sensitivity of the formation to damage if oil or water based drilling fluid is used. Recently industry has introduced technology to allow recovery and recycling of gas used in UBD operations.

The majority of UBD in British Columbia is conducted when drilling wells for the production of sweet natural gas from the Jean Marie formation northeast of Fort Nelson. In 2008, Encana Corporation initiated an UBD or Gas While Drilling (GWD) gas recovery project. The project involves the use of natural gas as a drilling fluid, allowing gas to be recovered and conserved instead of flared during drilling process. That year, 12 Jean Marie wells were drilled with the GWD process. 3.4 10^6 m^3 of gas, accounting for 46% of gas flowed from wells during drilling, was conserved. The recovery rate for the last four wells drilled averaged 81%, aligning UBD with the Province's conservation targets.

Inline testing at Terra Sunrise utilized for shipping gas through the sales line rather than sending it to flare. A sand filter is used to remove sand from gas. Solar panels harness energy to run both the Scada reporting system and methanol pumps.

Gas Processing Plants

The Commission saw an increase in the number of gas processing plant applications in 2008. Gas processing plants can be a significant source of emissions and flaring, therefore Commission efforts have been focused on conservation as a priority during the application review stage. All gas plants and large production facility applications submitted to the Commission in this fiscal year have been required to install flare gas measurement equipment. Capturing more accurate volumes enables industry to provide better flare volume data for reporting, tracking and meeting flaring reduction targets.

In reviewing plant applications, the Commission focuses on engineered solutions to minimize emissions and flaring. The Commission has been working with industry to design proposed gas plants with the expectation of testing wells through pipelines directly into the plant inlet. This requires intentional design consideration, and increases gas conservation by reducing flaring at wellsites.

An example of specific conservation design strategy is the installation of a VRU at the first and second phase of the Spectra West Doe Plant. As previously mentioned, VRUs capture and conserve all vapors from dehydration and tank systems that may otherwise vent to the atmosphere.

One major strategy being utilized at gas plants in British Columbia is the reduction of acid gas (gas containing hydrogen sulphide or carbon dioxide) flaring by using an injection well for disposal. This process injects the acid gas into underground formations or reservoirs that do not contain commercial hydrocarbons.

Acid gas injection is currently being utilized at the Keyera Caribou gas plant, the recently expanded Spectra West Doe gas plant, and at other existing plants in the northeast.

An alternative to injection is sulphur recovery. Murphy's Tupper plant (Figure 4) was designed to strip sulphur from acid gas. The sulphur recovery unit became operational in the second quarter of 2009.

It is a best practice to design gas gathering systems, plants, and facilities to aid in reducing duration of well clean up, minimize the need for flaring and enhance conservation.

Murphy's Tupper Plant, one of the state-of-the-art facilities in northeastern BC, specially designed with sulphur recovery systems to remove sulphur from natural gas.

Summary of Flared Volumes

Overall, industry achieved a 19% reduction in total gas flared from 1996 to 2008. Flare volumes from the five major sources of flaring in British Columbia from 1996 to 2008 are summarized in Table 1 below.

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Solution Gas (10^6 m^3)	182.9	199.5	146.4	88.1	75.0	59.8	50.3	48.9	33.9	33.0	36.1	30.9	26.5
Well Clean Up and Testing (10^6 m^3)	69.8	89.0	96.0	82.7	90.0	91.7	66.9	72.9	83.4	91.1	104.3	91.4	97.7
UBD (10^6 m^3)	1.4	4.5	3.1	0.1	11.0	25.7	38.6	86.6	92.0	71.5	55.1	59.0	47.2
Production Facilities (10^6 m^3)	40.9	26.9	24.3	21.3	24.8	28.4	25.3	21.8	25.7	27.4	25.9	37.9	37.5
Gas Processing Plant (10^6 m^3)	22.7	29.0	35.7	33.7	30.6	35.4	35.7	31.0	35.0	45.7	39.0	38.0	48.8
Total	317.7	348.9	305.5	225.9	231.4	241.0	216.8	261.2	270.0	268.7	260.4	257.2	257.7

Table 1. Summary of flared volumes from oil and gas sources between 1996 and 2008.

As shown above, solution gas was a major source of flare volume (ranging from 48% to 58% of the annual total volume) between 1996 and 1998. There was significant decline in flare volume from this source between 1999 and 2008 with percentage contributions of 39% and 10% respectively. In 2008, flared solution gas decreased to 14% of what was flared in the baseline year 1996.

Well clean up and test flaring averaged 33% of total flared gas over the 13 years. The only noticeable drop occurred in 2002 when the number of wells drilled decreased, resulting in decreased necessity of well test flaring.

Underbalanced drilling accounted for the most significant flare source in 2004 with 34% of the annual total volume. The advent of GWD technology has shown significant decreases in flaring from UBD, down to 18% of total annual volume in 2008.

Gas processing plant flaring held steady at an average of 13% total flared volume.

Figure 1 depicts the breakdown of flaring by source from 1996 to 2008.

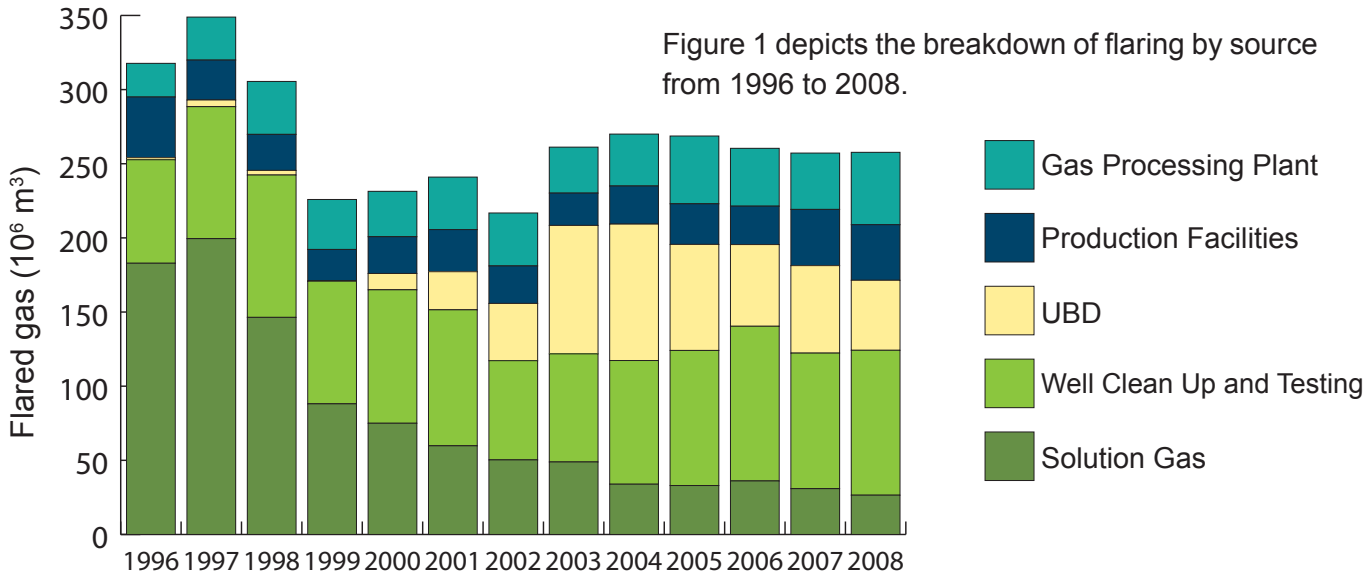


***Figure 1**. Flared volume broken down by sources for 1996 to 2008.*

Improved Conservation of Solution Gas

As illustrated in Figure 2, there was a significant improvement in the conservation of solution gas between 1996 and 2000. Conservation rates reached 97.4% in 2008, and continue to move in an upward trend.

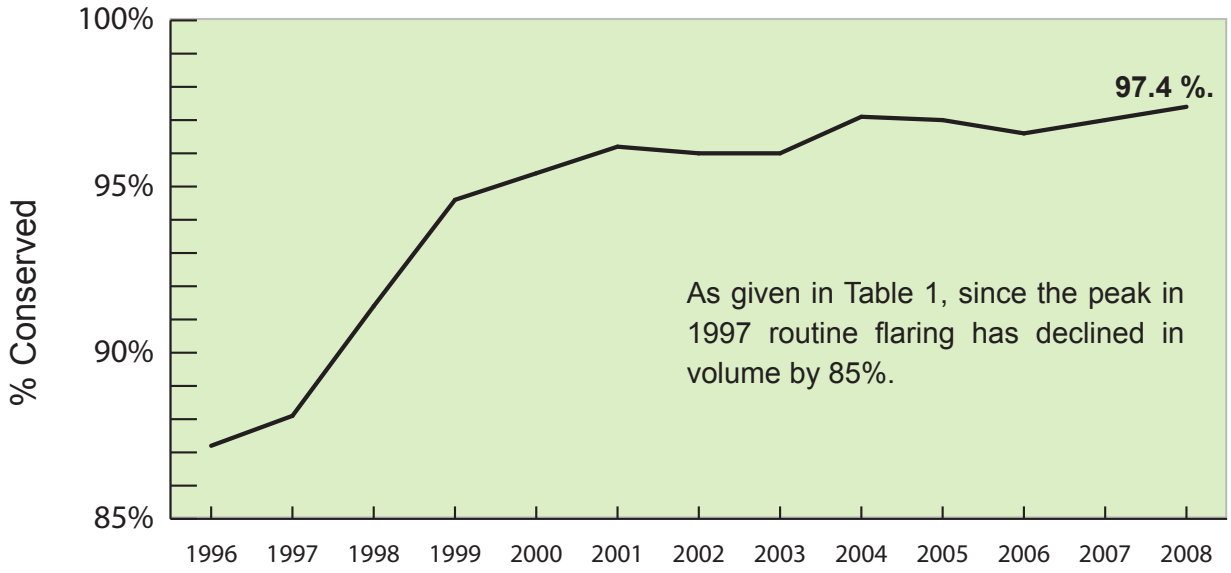


***Figure 2**. Solution gas conservation-time history*

Figure 3 shows the summary of solution gas produced versus solution gas flared between 1996 and 2008.

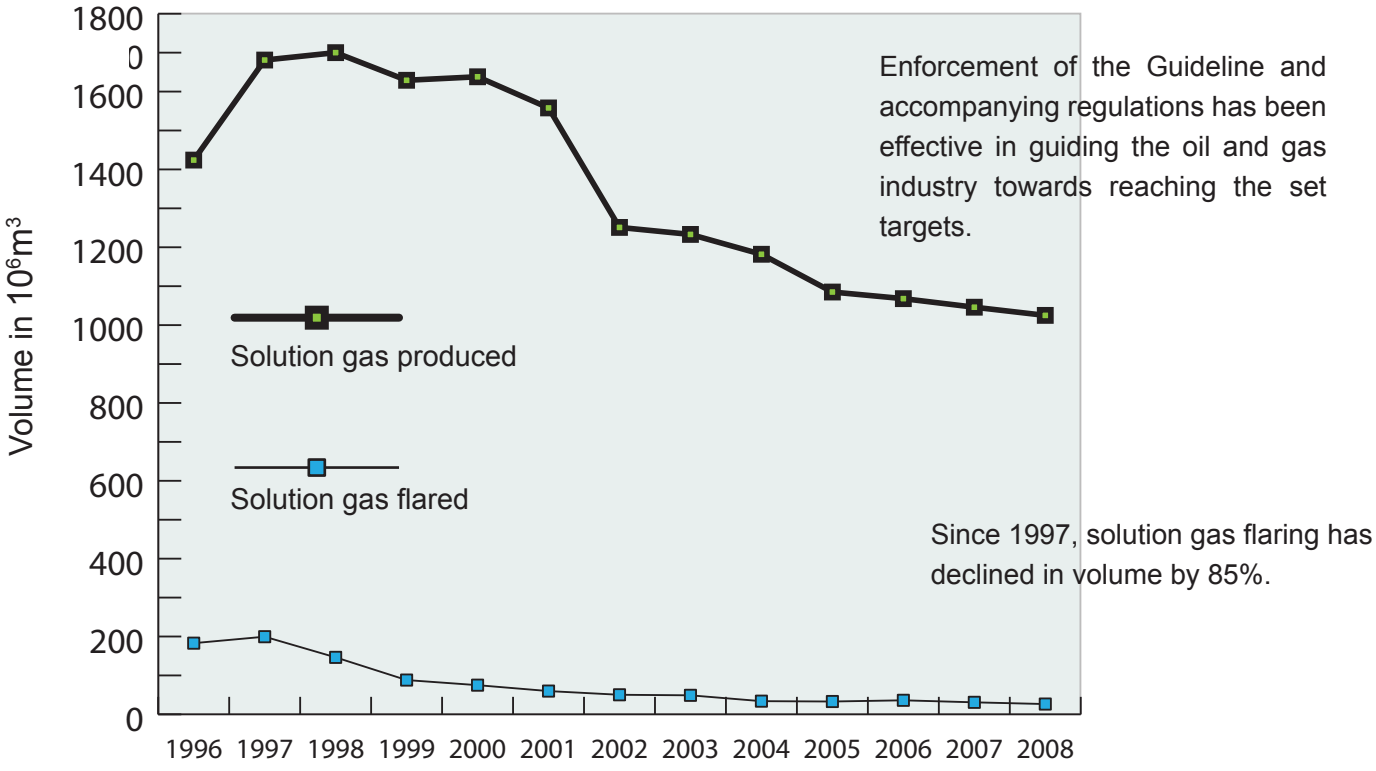


***Figure 3.** Solution gas production versus flaring by years.*

Economics and Conservation

Under the Guideline, companies are required to perform an economic analysis on all sites with solution gas flaring. If the Net Present Value (NPV) of the gas being flared is greater than a defined economic threshold (-$50,000) companies are required to conserve the gas. As of February 2009, economic analyses were performed on 14 single well batteries, resulting in seven wells being tied-in and conserving gas. This resulted in the elimination of 4.5 10^6 m^3 of solution gas flaring.

During March 2009, an additional 10 battery locations were identified to meet the Guideline criteria for running conservation economics. Flaring non-compliance letters were sent to the wellsite operators and conservation economics for the wellsites were completed and reviewed by the Commission. For conservation projects that met the Commission threshold, regulatory measures including well tie-ins (and in extreme cases, well shut-ins) were implemented.

In a related step, the Province of British Columbia introduced a carbon tax that has a direct impact on all gas used as fuel or flared. Fuel and flared gas is currently subject to the carbon tax – the rate as of July 1, 2008 for burning natural gas is 49.66 cents per gigajoule.

Additional Commission Initiatives

In order to assist in streamlining rules and regulations as well as improve efficiencies, the Commission is continually assessing internal processes and sector practices.

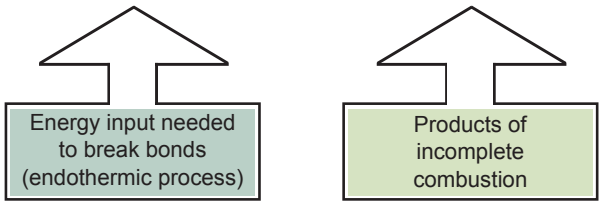
In fiscal 2008/09 the Commission rescinded the policy requiring confirmation of a proven well before a pipeline could be constructed to a wellsite. This flexibility allows increased inline testing by constructing a pipeline before testing a well where certainty of the production capability of the well exists.

The Commission also issued a policy allowing well tests to be conducted through temporary surface pipelines. This policy allows gas to be conserved through inline testing where a permanent pipeline has not yet been installed.

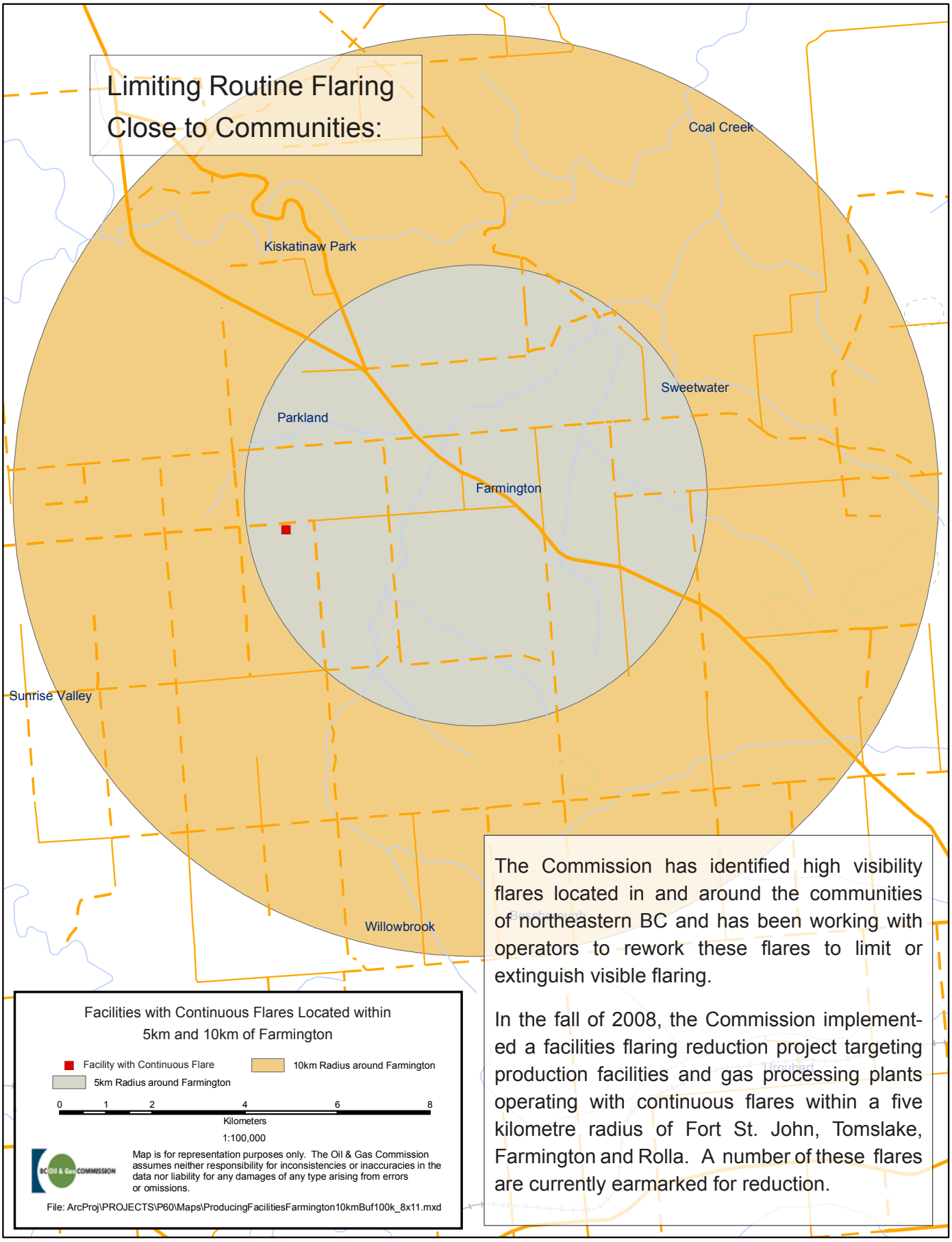
There have been three temporary surface lines installed in the fiscal year to test new gas wells, one of which was a sour gas well. The estimated volume of gas conserved with these inline tests was 1.5 10^6 m^3.

At standard conditions of 15° C and 101.325 kPa and assuming 95% combustion efficiency, 1m^3 of methane produces a trace amount of unburnt methane, as given in the combustion equation below:

$CH_4 + 1.90_2 \Rightarrow$ 0.95 CO2 + 1.9 H20 + 0.05 CH4 + Energy



From the balanced chemical equation for methane combustion, flaring reduction correlates with reducing greenhouse gas emission. By working with industry towards the eliminatation of flaring, the Commission is helping to protect the environment for British Columbians.



The Commission has identified high visibility flares located in and around the communities of northeastern BC and has been working with operators to rework these flares to limit or extinguish visible flaring.

In the fall of 2008, the Commission implemented a facilities flaring reduction project targeting production facilities and gas processing plants operating with continuous flares within a five kilometre radius of Fort St. John, Tomslake, Farmington and Rolla. A number of these flares are currently earmarked for reduction.


Pineview
Beatton Park
Charlie Lake
Charlie Lake Park
Fish Creek
Charlie Lake
Montney Creek
Fort St. John
Clairmont
Grand Haven
Tea Creek
Arnetts Coulee
Bouffioux Coulee
Old Fort
Crawfords Coulee
Moberly River
Birleys Coulee
Beckwiths Flat
Allens Coulee
Septimus
Flavells Coulee
Teko
Pine River
Septimus Creek
Facilities with Continuous Flares Located within
5km and 10km of Fort St. John
Facility with Continuous Flare
10km Radius around Fort St. John
5km Radius around Fort St. John
0 1 2 4 6 8
Kilometers
1:100,000
Map is for representation purposes only. The Oil & Gas Commission assumes neither responsibility for inconsistencies or inaccuracies in the data nor liability for any damages of any type arising from errors or omissions.
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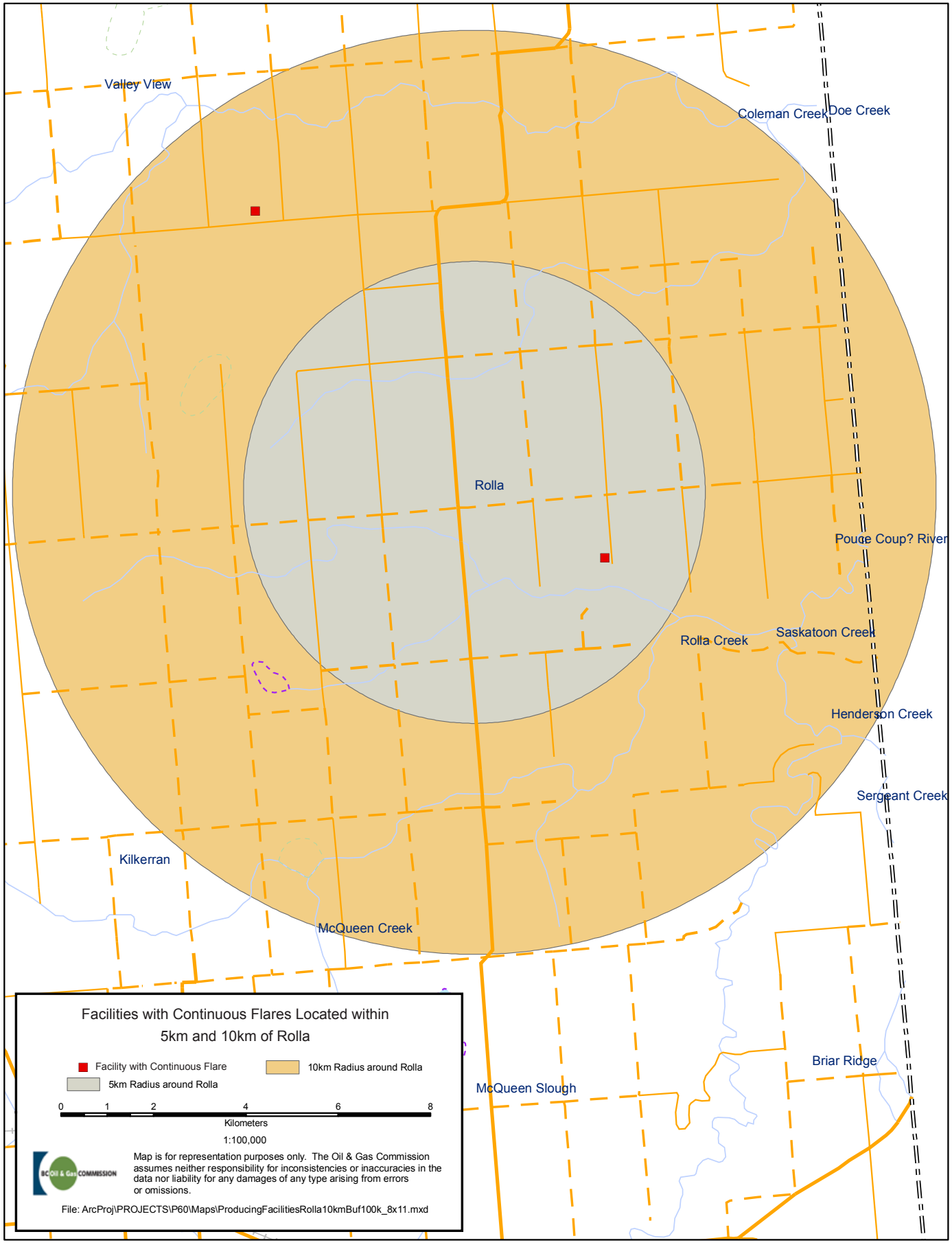
Valley View
Coleman Creek
Doe Creek
Rolla
Pouce Coup? River
Rolla Creek
Saskatoon Creek
Henderson Creek
Sergeant Creek
Kilkerran
McQueen Creek
McQueen Slough
Briar Ridge
Facilities with Continuous Flares Located within 5km and 10km of Rolla
Facility with Continuous Flare
10km Radius around Rolla
5km Radius around Rolla
0 1 2 4 6 8
Kilometers
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Map is for representation purposes only. The Oil & Gas Commission assumes neither responsibility for inconsistencies or inaccuracies in the data nor liability for any damages of any type arising from errors or omissions.
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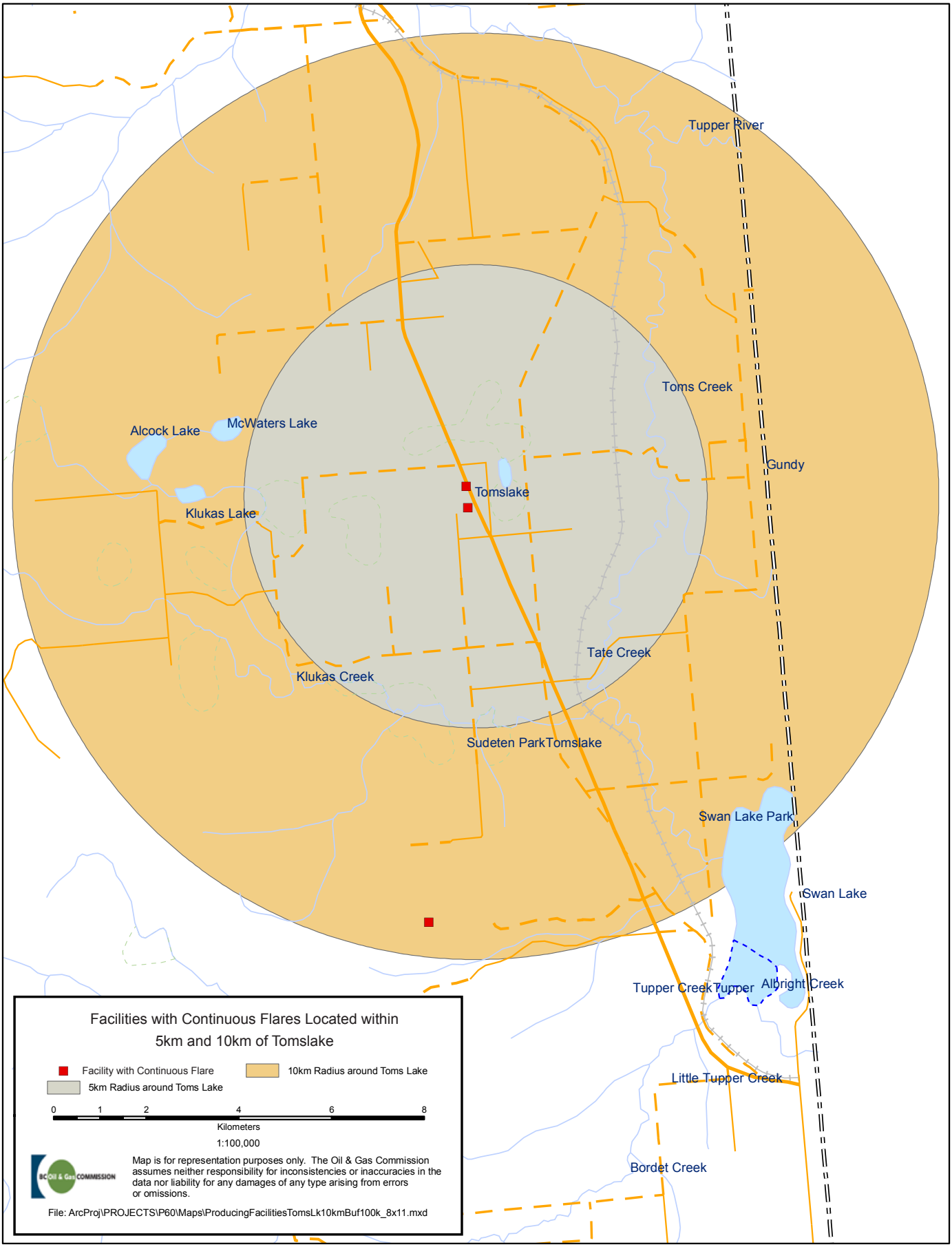
Tupper River
Toms Creek
Alcock Lake
McWaters Lake
Gundy
Tomslake
Klukas Lake
Tate Creek
Klukas Creek
Sudeten ParkTomslake
Swan Lake Park
Swan Lake
Tupper Creek
Tupper
Albright Creek
Little Tupper Creek
Bordet Creek
Facilities with Continuous Flares Located within 5km and 10km of Tomslake
Facility with Continuous Flare
10km Radius around Toms Lake
5km Radius around Toms Lake
0 1 2 4 6 8
Kilometers
1:100,000
Map is for representation purposes only. The Oil & Gas Commission assumes neither responsibility for inconsistencies or inaccuracies in the data nor liability for any damages of any type arising from errors or omissions.
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The BC Energy Plan

The BC Energy Plan released by the Province of British Columbia in 2007 set an interim goal of a 50% reduction of routine flaring at producing wells and production facilities by 2011 with the final goal of elimination of all routine gas flaring by 2016.

When released in March of 2008, Commission projections indicated the Guide could accomplish approximately 40% reduction in routine flaring in the near term, well before the Energy Plan interim target. Further reductions would be attained through other measures.

As previously mentioned, operators must consider and work through three flaring, incinerating and venting options:

1. Elimination.
2. Reduction when elimination is not possible, (for instance there is a lack of available infrastructure like pipelines and facilities in the vicinity due to remoteness of activity).
3. Improvement of the efficiency of flare, incinerator, and vent systems.

Significant changes captured by the Guideline will contribute to overall improvements in gas utilization through:

- Solution gas economic analysis,
- Flaring duration limits,
- Flaring duration shut-in requirements,
- Requirement to assess well test flares between one percent and five percent H_2S,
- Requirement to assess low pressure facility flares and incinerators for H_2S > one percent,
- Well test volume allowances,
- Gas plant flaring volume limits,
- Temporary facilities for in-line tests, and
- Flare gas minimum heating value.

Additionally, alternatives to flaring are provided. These include the redirection of gas to nearby plants, the use of clustering for solution gas, temporarily injecting gas back into a gas cap of an oil pool or gas reservoir.

The Commission recognizes that currently evolving technologies and practices may not be addressed by the Guideline and is prepared to accept innovative solutions, practices and technologies designed to help reach Guideline goals.

Flaring, Incinerating and Venting in British Columbia - Moving Forward

The Commission continues to focus on the reduction of flaring, incinerating and venting of gas resulting from upstream oil and gas industry activities in British Columbia through the implementation of the Flaring, Incinerating and Venting Reduction Guideline. The significant achievements communicated in this flaring report have been accomplished through:

- Increased scrutiny of flare applications,
- Economic assessments of associated (solution) gas flares,
- Improvements to existing facilities,
- Greater emphasis on design of new facilities to reduce flaring, and
- Policy changes (e.g. temporary pipelines, flowlines to unproven wells etc.).

The Commission will continue to implement and improve upon the steps laid out in the Guideline while encouraging stakeholders and industry to pursue innovative ways of reducing flaring in the Province. Ensuring optimal recovery of oil and gas resources continues to remain a key focus of the Commission.

Glossary

Acid Gas
Gas that is separated in the treating of solution or non-associated gas that contains hydrogen sulphide (H2S), total reduced sulphur compounds, and/or carbon dioxide (CO2).

Clustering
Clustering is defined as the practice of gathering the solution gas from several flares or vents at a common point for conservation.

Combustion efficiency (CE)
The CE quantifies the effectiveness of a device to fully oxidize a fuel. Products of complete combustion (i.e., CO_2, H_2O, and sulphur dioxide [SO_2]) result in all of the chemical energy released as heat. Products of incomplete combustion (e.g., CO, unburnt hydrocarbons, other partially oxidized carbon compounds, H_2S, and other reduced and partially oxidized sulphur compounds) reduce the amount of energy released. For the purposes of this guideline, CE is reported as the percentage of the net heating value that is released as heat through combustion.

Conservation
The recovery of solution gas for use as fuel for production facilities, other useful purposes (e.g., power generation), sale, or beneficial injection into an oil or gas pool.

Conservation Efficiency
Conservation efficiency (%) = (Solution gas production – Flared - Vented) / (Solution gas production) x 100

Fugitive Emissions
Unintentional releases of gas resulting from production, processing, transmission, storage, and delivery.

Gas Facility
A system or arrangement of tanks and other surface equipment (including interconnecting piping) that receives the effluent from one or more wells that might provide measurement and separation, compression, dehydration, dew point control, H2S scavenging, line heating, or other gas handling functions prior to the delivery to market or other disposition.

Nonroutine flaring, venting, incinerating
Intermittent and infrequent events such as planned maintenance, process upsets, and emergencies that result in flaring, venting, or incinerating.

Oil Battery
A system or arrangement of tanks or other surface equipment or devices receiving the effluent of one or more wells for the purpose of separation and measurement prior to the delivery to market or other disposition.

Routine Flaring
“Routine” applies to continuous flaring from any source including solution gas from oil production where it is not or cannot be economically conserved.

Solution Gas
For the purposes of this guideline, solution gas is gas contained within oil which is released from the liquid when pressure is decreased or temperature is increased.

Sour Gas
Gas containing H_2S. Depending on H_2S concentrations, sour gas may pose a public safety hazard if released or may result in unacceptable odours if vented into the atmosphere

Source
All gas flared, incinerated, or vented from a single operating site, such as an oil battery or multiple-well pad.

Sulphur Emissions
For the purposes of this guideline, this includes all air emissions of sulphur-containing compounds, including SO_2, H_2S, and total reduced sulphur compounds (e.g., mercaptans). Sulphur emissions from flare stacks are expected to be primarily in the form of SO_2, with minor amounts of other compounds.

Venting
The intentional controlled release of uncombusted gas.