

Flaring and Venting Review of Well Test Time Limits Final Report

Prepared by the
Flaring and Venting Project Team
for the
Clean Air Strategic Alliance
Board of Directors

June 2005

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About CASA

The Clean Air Strategic Alliance (CASA) is a non-profit association composed of stakeholders from three sectors – government, industry and non-government organizations such as health and environmental groups. All CASA groups and teams, including the board of directors, make decisions and recommendations by consensus. These recommendations are likely to be more innovative and longer lasting than those reached through traditional negotiation processes. CASA's vision is that the air will be odourless, tasteless, look clear and have no measurable short- or long-term adverse effects on people, animals or the environment.

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Glossary Of Terms And Acronyms

- CAPP:** Canadian Association of Petroleum Producers
- CBM:** Coal bed methane
- EUB:** Alberta Energy and Utilities Board
- Flaring:** Flaring is the burning of natural gas that cannot be economically conserved.
- FVPT:** Flaring and Venting Project Team
- Guide 40:** Refers to EUB *Guide 40*, May 1999: *Pressure and Deliverability Testing Oil and Gas, Minimum Requirements and Recommended Practices*.
- Guide 60:** Refers to EUB *Guide 60*, June 1999 and *Guide 60: Updates and Clarifications*, February 2001. The EUB regulates upstream petroleum industry flaring and venting according to the methods outlined in this Guide.
- SEPAC:** Small Explorers and Producers Association of Canada
- Venting:** Venting is the release of natural gases to the atmosphere where conservation or flaring is not practical due to gas volumes being too small or incapable of supporting combustion.

1. Background

The Flaring and Venting Project Team (FVPT) is a Clean Air Strategic Alliance (CASA) multistakeholder project team with representatives from industry, government, and non-government organizations. The FVPT had three main tasks:

- 1) Review the results of the implementation by CASA stakeholders of the 1998 Flaring Project Team recommendations, including the solution gas management framework.
- 2) Evaluate and recommend ways to similarly reduce the venting of natural gas.
- 3) Review and if necessary make recommendations on reducing natural gas flaring at facilities and during well testing.

2. Introduction

In September 2004, the CASA Board approved recommendations put forward by the FVPT regarding well test flare management. In addition to recommendations for improved public notification of well test flaring activities, the FVPT agreed that flaring and venting should only be conducted long enough to determine the economic viability of gas conservation and the data necessary to size the conservation equipment.

The group did not reach agreement on the length of time that this would require. It was proposed and accepted that data be gathered that would allow the duration requirements of well test flaring to be assessed. Where warranted, extensions would be provided for an agreed to set of reasons. If an extension is needed for a specific well, reasons for the extension should be provided to the Alberta Energy and Utilities Board (EUB). Moreover, the FVPT did not reach agreement on how to address the rights of the public to be heard in circumstances where a company has committed in its initial application not to flare and subsequently is faced with a change in circumstances that would require flaring.

FVPT agreed to reconvene in the second quarter of 2005 to address the above mentioned issues after well test flaring data are collected and the EUB prepares a draft proposal to address the public's right to be heard.

The FVPT reconvened in Q2 2005 to review the data and develop recommendations regarding the time limit for test flaring for oil, gas and CBM wells, including reasons for extensions, for implementation no later than January 1, 2006 and the EUB's proposal to ensure the rights of the public.

This report is addressing recommendations 28, 29 and 34 of the Gas Flaring and Venting in Alberta Report and Recommendations for the Upstream Petroleum Industry, September 2004¹; and recommendations 1, 2, 4 and 7 of the Flaring and Venting Recommendations For Coal Bed Methane Final Report, March 2005². The addressed recommendations are shown in Appendix A.

¹ See Final Reports of the Flaring and Venting Project Team at http://casahome.org/casa_library/index.asp

² See footnote 1

3. Oil, Gas and CBM Well Test Flaring

The EUB, in partnership with the Canadian Association of Petroleum Producers (CAPP) and Small Explorers and Producers Association of Canada (SEPAC), set up a program to collect data for well test flaring across the province, on the duration of well test flaring, volumes of gas flared, and to provide reasons for the test flaring taking longer than 72 hours. The program collected information for 29 oil wells, 298 CBM and 1896 gas wells. The data were collected for the period of February 07 to March 11, 2005. Spatial coverage of the province and type of well were considered when the wells were chosen for auditing.

The flaring data represented both the testing and clean up of wells. To ensure that the data collected for gas wells did not include CBM, a percentage of the gas wells where test flaring exceeded 120 hours was checked for geological formation because most CBM wells are found in one of the following three CBM formations in Alberta: Horseshoe Canyon, Mannville and Ardley. The collected data analysis and audits are in Appendix B and C.

The data showed that the percentages of well test flaring less than or equal to 72 hours are 72.4, 91.6 and 48.3% of the total number of well tests that flared for oil, gas and CBM respectively. In all, 90% of oil wells, 98% of gas well and 77% of CBM wells flared or vented less than or equal to 120 hours. Data for 15 wells were audited because of their extended period of flaring. Two of the 15 audits did not recover sufficient data to verify or deny that the flare time was justified, resulting in 13 audits for analysis instead of 15. The audited well testing data indicated that extended flaring was not justified for two oil wells and two gas wells.

A. Recommendations for Oil and Gas (not including CBM)

The FVPT has agreed that different flare durations will be needed for different production sectors (oil, gas and CBM).

Accordingly, the FVPT recommends the following:

1. Oil and gas well test flaring/venting (including clean up, completion, and testing) be limited to a total period of 72 hours (not necessarily consecutive, i.e. excluding shut in time) per zone tested. If flaring/venting for longer than 72 hours is required the following reasons will be accepted by the EUB:
 - To clean up the well bore in unique situations;
 - Where stabilized flow has not been reached; or
 - Where there have been mechanical problems with the well.
 - a. The operator must document these reasons and keep the information on file for audit by EUB when requested, but need not request permission to extend the flaring/venting past 72 hours.
 - b. If the audited operator failed to justify the exceedance of the 72 hours limitation, then the EUB enforcement policies would apply.
2. If additional time for well test flaring/venting is needed, for reasons other than those mentioned above, the EUB should be contacted as soon as possible with the reasons for extension, but not later than the end of the 72 hour period.
3. When well test information indicates clean up is complete and the well flow is stabilized, flaring/venting must be discontinued.

B. Recommendations for Dry CBM

The FVPT has defined dry CBM wells as CBM wells producing less than 1m³ of water per operating day.

Accordingly, the FVPT recommends the following:

4. For dry CBM wells classified as development wells, well test flaring/venting (including clean up, completion, and testing) be limited to a total period of 120 hours (not necessarily consecutive, i.e. excluding shut in time) per zone tested. If flaring/venting for longer than 120 hours is required the following reasons will be accepted by the EUB:
 - To clean up the well bore in unique situations;
 - Where stabilized flow has not been reached; or
 - Where there have been mechanical problems with the well.
 - a. The operator must document these reasons and keep the information on file for audit by EUB when requested but need not request permission to extend the flaring/venting past 120 hours.
 - b. If the audited operator failed to justify the exceedance of the 120 hours limitation, then the EUB enforcement policies shall apply.
5. If additional time for well test flaring/venting is needed, for reasons other than those mentioned above, the EUB should be contacted as soon as possible with the reasons for extension, but not later than the end of the 120 hour period.
6. When well test information indicates clean up is complete and the well flow is stabilized the flaring or venting must be discontinued.
7. For dry CBM not classified as development wells, well testing flaring/venting (including clean up, completion and testing) would be limited to a total period of 336 hours (not necessarily consecutive, i.e. excluding shut in time) per zone tested. If flaring/venting for longer than 336 hours is required the following reasons will be accepted by the EUB:
 - To clean up the well bore in unique situations;
 - Where stabilized flow has not been reached; or
 - Where there have been mechanical problems with the well.
 - a. The operator must document these reasons and keep the information on file for audit by EUB when requested, but need not request permission to extend the flaring/venting past 336 hours.
 - b. If the audited operator failed to justify the exceedance of the 336 hours limitation, then the EUB enforcement policies shall apply.
8. If additional time for well test flaring/venting is needed, for reasons other than those mentioned above, the EUB should be contacted as soon as possible with the reasons for extension, but not later than the end of the 336 hour period.
9. When well test information indicates clean up is complete and the well flow is stabilized, the flaring or venting must be discontinued.

C. Recommendation for Wet CBM

The FVPT has classified wet CBM wells as CBM wells producing more than 1m³ of water per operating day. Wet wells need dewatering that may take several months to determine if the well is commercial. The collected data did not include any wet CBM; as such, the FVPT will maintain the original recommendations pertaining to wet CBM listed in the Flaring and Venting Recommendations For Coal Bed Methane Final Report, March 2005. The original recommendations are in Appendix D.

4. Commitments to Not Flare

Regarding the EUB's proposal to ensure that the rights of the public to be heard in circumstances where a company has committed in its initial application not to flare and subsequently is faced with a change in circumstances that would require flaring, the EUB will present the proposal to the team in September 2005 for review.

5. Regulatory Review

FVPT also wanted to ensure that the operators are only flaring and venting wells to obtain the necessary information for well production and not just to address other regulatory requirements that could be alleviated. Therefore, the FVPT recommends:

10. EUB will review EUB's well test requirements (i.e. Guide 40) by January 1, 2006 to see if flaring/venting from well tests can be reduced.

6. Framework Review

The EUB will audit a percentage of well test data that exceed the specified time limit of each sector. The FVPT suggested that EUB audit 15% of tested wells exceeding the time limits. However, the auditing percentage will be left at the EUB's discretion. In keeping with a previous recommendation regarding review of the entire flaring and venting framework in 2007, as approved by the CASA Board in September 2004, the FVPT recommends as follows:

11. The Flaring and Venting Project Team review the audit data when the FVPT reconvenes in the first quarter of 2007.

Appendix A: Recommendations from previous FVPT reports

Recommendations from Gas Flaring and Venting in Alberta Report and Recommendations for the Upstream Petroleum Industry, September 2004:

- 28) The EUB, in partnership with CAPP and SEPAC, set up a program to collect data for a period of well testing across the province, as to the length of tests, volumes of gas flared, and provide reasons if the tests take longer than 72 hours. The Flaring and Venting Project Team be reconvened in the second quarter of 2005 to review the data and develop recommendations regarding the time period for well testing, for implementation January 1, 2006.
- 29) Until January 1, 2006, well testing (including clean up and testing) would be limited to a total period of 120 hours (not necessarily consecutive, i.e. excluding shut in time) per zone tested unless an exemption has been specifically granted.
 - a) Exemptions may be granted:
 - to clean up well bore in unique situations;
 - where stabilized flow has not been reached; or
 - where there have been mechanical problems with the well.
 - b) If additional time for well test flaring is needed the EUB should be contacted as soon as possible with the reasons for extension, but not later than the end of the 120 hour period.
- 34) The EUB develop a proposal to ensure that the rights of the public to be heard are protected in circumstances where a company has committed in its initial application to not flare and subsequently is faced with a change in circumstances that would require flaring. The EUB will bring its proposal to the CASA Flaring and Venting Project Team when it reconvenes in the second quarter of 2005.

Recommendations from Flaring and Venting Recommendations For Coal Bed Methane Final Report, March 2005:

- 1) The EUB, in partnership with CAPP and SEPAC, set up a program to collect one month of data on the flaring and venting associated with CBM wells producing less than 1m³ of water per operating day across the province. Data to be collected includes the duration of flaring and/or venting, volumes of gas flared and/or vented, and reasons if the flaring and/or venting extends longer than 72 hours.
- 2) The Flaring and Venting Project Team be reconvened in Q2 2005 to review the data and develop recommendations regarding the time period for flaring and venting associated with CBM wells producing less than 1m³ of water per operating day for implementation January 1, 2006.

Appendix B: Well Test Data Analysis (February 07 – March 11, 2005)

Well Type	Number	%	Tot. Vol.	Avg. Vol.	All Wells	Number	%	Tot. Vol.	Avg. Vol.				Hours	Days
Oil	29	1.3%	698.5	24.1	Flaring <72 Hrs	1905	85.7%	131108.2	68.8				72	3
CBM	298	13.4%	6177.6	20.7	73 - 120 Hrs	201	9.0%	8906.5	44.3				120	5
Gas	1896	85.3%	139434.3	73.5	121 - 168 Hrs	39	1.8%	2113.7	54.2				168	7
Total Wells	2223	100.0%	146310.4	65.8	169 - 336 Hrs	58	2.6%	2989.2	51.5				336	14
					337 - 504 Hrs	14	0.6%	876.7	62.6				504	21
					505 - 720 Hrs	2	0.1%	176.2	88.1				720	30
					> 720 Hrs	4	0.2%	139.9	35.0					
					Total Wells	2223	100.0%	146310.4	65.8				All volumes are 10³m³	
										Audits				
					95% of wells were flared / vented 120 hours or less					15 data requests were sent out, 13 were returned.				
										At least 4 of the 13 tests we received production information on could have been significantly shorter, and less than 120 hours.				
Oil Wells	Number	%	Tot. Vol.	Avg. Vol.	CBM Wells	Number	%	Tot. Vol.	Avg. Vol.	Gas Wells	Number	%	Tot. Vol.	Avg. Vol.
Flaring <72 Hrs	21	72.4%	233.6	11.1	Flaring <72	139	46.6%	1635.0	11.8	Flaring <72	1745	92.0%	129239.7	74.1
73 - 120 Hrs	5	17.2%	392.7	78.5	73 - 120 Hrs	90	30.2%	1686.9	18.7	73 - 120 Hrs	106	5.6%	6826.9	64.4
121-168 Hrs	1	3.4%	21.1	21.1	121 - 168 Hrs	15	5.0%	337.8	22.5	121 - 168 Hrs	23	1.2%	1754.8	76.3
169 - 336 Hrs	2	6.9%	51.1	25.6	169 - 336 Hrs	37	12.4%	1760.7	47.6	169 - 336 Hrs	19	1.0%	1177.3	62.0
337 - 504 Hrs	0	0.0%	0	0.0	337 - 504 Hrs	12	4.0%	468.5	39.0	337 - 504 Hrs	2	0.1%	408.2	204.1
505 - 720 Hrs	0	0.0%	0	0.0	505 - 720 Hrs	2	0.7%	176.2	88.1	505 - 720 Hrs	0	0.0%	0	0.0
> 720 Hrs	0	0.0%	0	0.0	> 720 Hrs	3	1.0%	112.5	37.5	> 720 Hrs	1	0.1%	27.4	27.4
Total Oil Wells	29	100.0%	698.5	24.1	Total CBM Wells	298	100.0%	6177.6	20.7	Total Gas Wells	1896	100.0%	139434.3	73.5
90% of oil wells were flared / vented 120 hours or less					77% of CBM wells were flared / vented 120 hours or less					98% of gas wells were flared / vented 120 hours or less				
Wells South of Calgary (Township <23)					Wells Between Calgary & Edmonton (Township 23 - 52)					Wells North of Edmonton (Township >52)				
	Number	%				Number	%				Number	%		
Flaring <72 Hrs	344	97.2%			Flaring <72 Hrs	758	80.0%			Flaring <72 Hrs	803	87.1%		
73 - 120 Hrs	4	1.1%			73 - 120 Hrs	118	12.5%			73 - 120 Hrs	79	8.6%		
121-168 Hrs	0	0.0%			121-168 Hrs	21	2.2%			121-168 Hrs	18	2.0%		
169 - 336 Hrs	2	0.6%			169 - 336 Hrs	37	3.9%			169 - 336 Hrs	19	2.1%		
337 - 504 Hrs	4	1.1%			337 - 504 Hrs	8	0.8%			337 - 504 Hrs	2	0.2%		
505 - 720 Hrs	0	0.0%			505 - 720 Hrs	2	0.2%			505 - 720 Hrs	0	0.0%		
> 720 Hrs	0	0.0%			> 720 Hrs	3	0.3%			> 720 Hrs	1	0.1%		
Southern Wells	354	100.0%			Central Wells	947	100.0%			Northern Wells	922	100.0%		
*6 CBM wells in southern region					*292 CBM wells in central region					*0 CBM wells in northern region				

Appendix C: Well Test Data Audit (February 07 – March 11, 2005)

Audit #	Type	H2S (mol/kmol)	Formation	Volume (e3m3)	Duration (Hrs)	Finding
1	Oil	0	Cardium	1.58	331	Sufficiently stabilized after 4 - 6 days, flared 14. Not a serious concern as test results showed conservation to be uneconomic.
2	Oil	0.02	Key River	49.5	201	Sufficient data after 48 hours, additional time was used to produce oil. Should have been shut-in.
3	Oil	3.75	Montney	137.8	112	Stabilized after 3 - 5 days, clean up problems justified continued flaring. A phone call to the Field Centre at 5 days would have been appropriate.
4	CBM	0	Horseshoe Canyon	40.32	384	Insufficient data returned.
5	CBM	0	Multi-zone	33	1008	Coal seams perfed in stages and flared 7 days each. Exploratory well, exception to this company's normal practice. Evaluating water production. Flaring appears justified.
6	CBM	0	Horseshoe Canyon	141	2664	Appeared to stabilize in 2 -3 days and well appeared economic (1.68 e3m3/day). After 1 month, production started to drop again, and never stabilized. Shut-in at 4 months (0.65 e3m3/day), and well is uneconomic. Tie-in decision pending.
7	CBM	0	Lethbridge CBM	19.24	334	Insufficient data returned.
8	CBM	0	Horseshoe Canyon	35.06	168	Tested for 7 days, consistent slow decline. Never stabilized, final production rate 2.93 e3m3/day (started at 4.7e3m3/day). Flaring appears justified.
9	Gas	0	Montney Sand	234.02	256.83	Stabilized after 3 days, needed 7 additional days on clean up. Flaring appears justified, a phone call to the Field Centre after 3 days would have been appropriate.
10	Gas	0	Ostracod	48.94	194.94	Clean up no longer effective after first 4 days, flared 8. Flow rate remained constant. Last 4 days unnecessary, flow rate was 4e3m3/day (total flared 48 e3m3). A phone call after 4 days to say they were still trying to recover load fluids would have been appropriate.
11	Gas	0	Grosmont	89.5	161	Two zones tested consecutively, both show declining flow rates and never stabilized (12 e3m3/day to start, declined to 8.4 e3m3/day) 6.7 days for two zones. Flaring appears justified.
12	Gas	0	Bluesky A	71.067	246	Very little change in production rate over entire test, flared 10 days. Company acknowledged test was stable from the start. Should have shut-in at 3 days.
13	Gas	0	Ellerslie	93.397	106	Test essentially stabilized at 3 days, flared 4.5 days.
14	Gas	0	Cardium	56.236	144	Sand frac resulted in sand in casing. Took 70 hours to flush sand out of wellbore. Tested for 72 additional hours, had stabilized within 3 - 4 hours.
15	Gas	0	Bluesky	46.5	136	89 hour clean up with coil tubing unit, over 5 day period. Tested 47 additional hours, stabilized within 29 hours (flared extra 18 hours following stabilization). Flaring appears justified.

Appendix D: Recommendations for Wet CBM well testing from March 2004 CBM report

6. For CBM wells producing more than 1m^3 of water per operating day, flaring or venting must cease (gas must be conserved) within 6 months of gas production for an individual well exceeding $100 \times 10^3\text{m}^3$ for any three-month period (approx. $1100 \text{m}^3/\text{day}$). Shorter tie-in periods must be pursued whenever possible. Operators must notify the EUB as soon as gas production exceeds $100 \times 10^3\text{m}^3$ for any three-month period at a CBM well producing more than 1m^3 of water per operating day that is flaring or venting.

For CBM wells producing more than 1m^3 of water per operating day that do not trigger the above (i.e., $100 \times 10^3\text{m}^3$ for any three-month period), flaring and venting is limited to the lesser of:

- a total period of 18 months, including the period to tie the well in, or,
 - a total volume of $400 \times 10^3\text{m}^3$ for Tier 2 (development) wells or $600 \times 10^3\text{m}^3$ for Tier 1 (other) wells, per zone tested. Wells that are already tied-in would be treated as Tier 3 and allowed a maximum flare volume of $200 \times 10^3\text{m}^3$.
7. If additional flare times or volumes are needed to test a CBM well producing more than 1m^3 of water per operating day, the operator must make a written request for such to the EUB as early as possible and in no case later than the end of the 18 month or volume allowance flare or vent period. Any extension request must include the reasons for the extension. Extensions may be granted to allow for additional flare time or volume for reservoir evaluations or where other special circumstances warrant.

Appendix E: Flaring and Venting Project Team Revised Terms of Reference

Flaring/Venting Project Team Revised Terms of Reference

Purpose:

- To assess the performance and make recommendations regarding the Alberta solution gas flaring management framework.
- To develop recommendations to address a broader range of flaring and gas venting issues in Alberta.

Objectives:

1. Determine whether the solution gas flaring reduction targets for 2000 and 2001 have been met
2. Determine, based on improved information, firm future reduction targets, time lines and threshold volumes for solution gas flaring
3. Evaluate the royalty treatment of flared and vented gas and cost sharing programs and their implication for achieving future reduction targets
4. Evaluate the approval process and determine if fixed term approvals are required
5. Review performance requirements and efficiency standards, and determine the feasibility of combustion efficiency standards for all flares
6. Assess research findings and their implication for management of flaring and venting.
7. Review information on gas venting and mitigation approaches and recommend a venting management framework, including short-term actions and long-term strategies
8. Review and develop recommendations with regard to EUB Guide 60, and Guide 60 Updates and Clarifications document
9. Develop recommendations for a strategy to respond to the issues associated with flaring and venting
10. Review information and develop recommendations for the regulation of flaring and venting associated with coal bed methane/natural gas from coal development

Note: Objectives #1-6 came from Section 6.0 of the CASA Flaring Project Team's 1998 report: *Management of Routine Solution Gas Flaring in Alberta*. To reflect the broader scope of the Flaring/Venting Project Team, objectives #3 and 6 have been expanded to include all flaring and venting, and #5 to include all flaring.

Context:

The Terms of Reference for this project team supports the objectives identified in CASA's *Business Plan 1999-2002*, fits well within the priorities, values, and expectations of the CASA board, and is in accordance with the CASA vision for air quality.

Recommendations developed by the project team will reflect CASA's goals for air quality in Alberta, namely: 1) Protect the Environment; 2) Optimize Economic Performance and Efficiency; and 3) Seek Continuous Improvement.

Report to the CASA Board:

The Flaring and Venting Project Team will report to the CASA board in September 2004, with an addendum to this report that will focus on recommendations relating to on Coal Bed Methane development to follow in November 2004.

Membership:

Alberta Association of Municipal Districts and Counties

Alberta Cattle Commission

Alberta Department of Energy

Alberta Energy and Utilities Board

Alberta Environment

Alberta Health and Wellness Upstream Oil and Gas Industry, both heavy oil and conventional oil

Pembina Institute

Prairie Acid Rain Coalition

Resident for Accountability in Power Industry Development

Small Explorers and Producers Association of Canada

Wild Rose Agricultural Producers

Appendix F: Flaring and Venting Project Team List of Members

Name	Organization Name
Justin Balko	Alberta Health and Wellness
Karina Bodo	Alberta Health and Wellness
Michael Brown	Alberta Energy and Utilities Board (EUB)
Terri Carroll	Small Explorers & Producers Association of Canada (SEPAC)
Jeff Cormier	Alberta Department of Energy
Gur Dhaliwal	Alberta Department of Energy
Randy Dobko	Alberta Environment
Chris Hay	Imperial Oil/CPPI
Wayne Hillier	Husky Energy
Ahmed Idriss	Clean Air Strategic Alliance
Martha Kostuch	Bert Riggall Environmental Foundation & PARC
Alexander MacKenzie	Alberta Health and Wellness
John Parr	Canadian Natural Resources Limited
Ian Peace	Residents for Accountability in Power Industry Development (RAPID)
Mike Queenan (Alt)	Residents for Accountability in Power Industry Development (RAPID)
Barry Ranger	Small Explorers & Producers Association of Canada (SEPAC)
Doreen Rempel	MGV Energy Inc./CSUG
Michael Rodyniuk	Alberta Beef Producers
Chris Severson-Baker	Pembina Institute
Ralph Smith	Wildrose Agricultural Producers
Jim Spangelo	Alberta Energy and Utilities Board (EUB)
John Squarek	Canadian Association of Petroleum Producers (CAPP)