Andrew Skuce, in response to your query. Attribution to Ministry of Environment.

1 How is the 108 kt figure for fugitive methane emissions in 2010 calculated? The 108 kt of fugitive methane is calculated by Environment Canada using methods outlined in Annex 3.1 of the National Greenhouse Gas Inventory Report 1990-2010, available at: http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/can-2012-nir-11apr.zip. "Fugitive emissions from the upstream oil and gas (UOG) industry are based on the study A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry (CAPP 2005a), as prepared for the Canadian Association of Petroleum Producers (CAPP) by Clearstone Engineering Ltd. A Tier 3 analysis was performed to estimate all GHG emissions from the UOG sector for the year 2000, with the exclusion of oil sands mining, extraction and upgrading. The emissions were then backcast to the years 1990 through to 1999 to develop emission estimates for the industry. The UOG fugitive emissions for 1990-2000 were taken directly from the UOG study (CAPP 2005a). UOG fugitive emissions for 2001 and onwards are based on the UOG estimation model (CAPP 2005b) (hereafter referred to as the UOG model). The UOG model was also prepared for CAPP by Clearstone Engineering Ltd. (CAPP 2005b) and is based on information from CAPP (2005a). The UOG model is divided into the same sectors and sources the 1990-2000 UOG inventory."

2) What percentage of methane produced in BC is vented deliberately and/or accidentally to the atmosphere?

BC produced approximately 41,441,000 thousand cubic meters of gas in 2011 (http://www.capp.ca/library/statistics/handbook/Pages/default.aspx, Table 3.9b, page 97 of the handbook) and had natural gas fugitive and venting greenhouse gas emissions of 4.38 Mt CO2e (Greenhouse Gas Reduction (Cap and Trade) Act Reporting Regulation data available at: http://www.env.gov.bc.ca/cas/mitigation/ggrcta/reporting-regulation/emissions-reports.html and summarized below. Of the 4.38 Mt CO2e, 2.408 Mt is venting of carbon dioxide in acid gas removal and is therefore not venting of methane, leaving 1.972 M CO2e t of methane venting. If the full amount produced in 2011 was vented to the atmosphere, approximately 590 Mt CO2e would be released. Actual venting and fugitive methane emissions are therefore around 0.3% of total methane production.

Year	Natural gas production (m3)	Methane mass density (kg/m3)	Methane amount (t CH4)	CO2e amount (Mt CO2e) if all released into Atm.	Actual venting (Mt CO2e)	% vented out of total production	Year	TAR GWP 100yr
2010	34,991,762,000	0.678	23,724,415					
	498.21	1.97	0.4%	2010	21			
2011	41,441,414,000	0.678	28,097,279					
	590.04	1.97	0.3%	2011	21			

>>> So for 2011 data, the percentage actually vented is approximately 0.3% of the total amount produced.

Values						
Row Labels	Sum of Total Venting	Sum of Total Fugitive	Sum of Total Flaring	Sum of Total Stationary Combustion	Sum of Total Wastewater	Sum of GRAND TOTAL in CO2e
211113 (Conventional Oil and Gas Extraction)	3272089	948291	526334	5340231	17	10086963

211114 (Non-Conventional Oil Extraction)	10400	14379	2176	33638	0	60592
221210 (Natural Gas Distribution)	6462	16537	2617	6318	0	31934
486210 (Pipeline Transportation of Natural Gas)	42816	71897	2	214036	0	328752
Grand Total	3331767	1051104	531129	5594223	17	10508241

>>> I note that the GHG equivalence of methane in terms of CO2 uses a factor of 21, which implies a reference time of 100 years. The last IPCC Report, AR4, uses a factor of 25. Researchers now say a shorter time interval, i.e. 20 years and a much higher GWP factor would be more appropriate. Is the BC Government contemplating any change to its methods for accounting for methane emissions?

BC follows Environment Canada and United Nations Framework Convention on Climate Change (UNFCCC) inventory protocols which currently mandate use of the Second Assessment Report (AR2) Global warming potentials. Revised UNFCCC reporting guidelines will be in effect internationally starting with the 2015 submission of 1990-2013 inventory reports (subject to a UNFCCC decision in late 2013). Given the importance of international standardization, British Columbia will follow the same timeframe and approach. Please note that this include only an update to the 100 year GWPs and does not include a switch to use of 20 year GWPs

>>> BC has published complete and detailed 2011 oil and gas emissions data calculated using prescribed quantification methods (http://www.env.gov.bc.ca/cas/mitigation/ggrcta/pdf/Final_Essential_Requirements_of_Mandatory_Reporting_Second_Update_December_21_2011.pdf) and in majority verified by third party verifies from the Greenhouse Gas Reduction (Cap and Trade) Act Reporting Regulation (http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/272_2009) at: http://www.env.gov.bc.ca/cas/mitigation/ggrcta/reporting-regulation/emissions-reports.html . Emissions by specific oil and gas source in tonnes of CO2e are provided at http://www.env.gov.bc.ca/cas/mitigation/ggrcta/reporting-regulation/emissions-reports-qa.html) (see the answer to question 31. What are the emissions from the different oil and gas sources in British Columbia?). Given that this data was obtained through regulatory reporting, uses prescribed quantification methods and is (in vast majority) third party verified it is believed to be more accurate than the top-down methods used in the Provincial and National Inventory Reports. We are exploring recalculating the oil and gas line items (among several others) in the Provincial report using the Reporting Regulation data.