

**EnCana Corporation comment and proposed changes in response to Public Comments for
 QUANTIFICATION PROTOCOL FOR
 INSTRUMENT GAS TO INSTRUMENT AIR CONVERSION IN PROCESS CONTROL SYSTEMS
 for the public positing period closing Feb 7, 2009.**

#	Page number, Line number	Type of Comment (general, technical, editorial	Comment of Justification for Proposed Wording Change	Proposed Word Change	EnCana Corporation Comment
1		General	Clarification	<p>It appears that this protocol only applies to a retrofit type of project where the existing gas system is replaced by an air system. This should be stated explicitly in the Protocol Applicability section.</p> <p>The protocol should define whether the equipment replacement is not just a normal replacement due to the end life of the equipment.</p> <p>The applicability criterion #1 may require additional guidance.</p>	<p>Applicable- The following Item has been added and will be Item # 1 in the Protocol Applicability section: “1. The instrument air system replaces an existing instrument gas system that provides equivalent function. The instrument air conversion must not impair the functionality of the process control system as demonstrated by unit operational performance data, and/or facility process flow diagrams and/or other equipment technical specifications. Functional equivalence may also be demonstrated through an affirmation by the project developer or a third party.” The following Item has been added and will be Item # 2 in the Protocol Applicability section: “The project is a conversion from instrument gas to instrument air and not facilities originally constructed to use instrument air or replacements due to end-of-life. This may be demonstrated by facility process flow diagrams and/or accounting records, work orders, invoices or other vendor/third party documentation/evidence. Instrument air conversions may also be demonstrated through an affirmation by the project developer or a third party.” Applicable-The following paragraph has been added to section 2.2 p.13, line 17 “The aforementioned baseline approach is justified as follows. Pneumatic devices are designed to run at a specific supply pressure, regardless of the pressure source. In the gas equivalency formula presented in APPENDIX A, pressure is</p>

				Functional equivalence should likely be covered in the baseline section (2.2)	assumed to be equal in the instrument gas and instrument air condition. To solve the gas equivalency formula, both fuel gas and air pressure are assumed to be equal. Therefore when the formula is solved, the energy loss in both the fuel gas and air condition is equal. This allows us to establish a relationship between the volume of air in the project condition and the volume of fuel gas in the baseline condition. As a result, this baseline methodology ensures functional equivalence because pressures in baseline and project conditions are assumed to be equal. Furthermore, this is an industry-accepted methodology to compare air and fuel gas emissions.”
2		Technical	Clarification	The instrument air flow rate is defined based on <u>one month</u> of measurements. The particular month is to be chosen by the proponent as being reflective. More guidance is likely prudent to facilitate verification (i.e. address production levels, facility/equipment down time/ shut downs).	<p>Applicable- Comment: The protocol requires the proponent to choose a month the is representative of normal operating conditions to conduct the one month metering as per line 36, p.2. To provide additional guidance on this issue, the following paragraph will be added to the Protocol Approach section (line 5, p. 3): “The one month metering period ensures a conservative approach. This is because leaks are prone to appear in pneumatic systems over time. Therefore by setting the baseline close to the leak inspection and repair program, and for a short period of time, the risk of overestimating measured emissions is reduced. Furthermore, the longer the system is metered the increased likelihood that these quantities include leaks. To facilitate verification, the project proponent should identify the run time of principle equipment such as compressors, dehydrators, or other equipment within the facility to show continuity and typical runtimes. The runtime of this equipment in subsequent months should be compared to the hours it operated during the period of one month metering. The percentage difference is then applied against the offsets calculated for that month to account for any variations in facility operation.”</p> <p>Applicable- Covered in the Protocol Applicability Item #1 (see above).</p>

				The concept of operational hours should likely be woven into the guidance on functional equivalence.	
3		Technical	Clarification	<p>The project proponent should identify all vent sources served by compressed gas in the baseline and keep a list to track the sources of vent gas reductions.</p> <p>This way they can compare the equipment manufacturer's estimates for methane emissions to the claimed reductions based on metering of air</p>	<p>Applicable- It was the intention of the protocol to require project proponent to develop a device inventory. However it was not explicitly stated. Therefore, Flexibility Mechanism #5 was removed. In the Protocol Applicability section, a new Item was added which will now be Item # 3 and will read as follows: “3. To facilitate verification and allow for changes in the facility, the proponent will develop an inventory of devices to be maintained annually. Any changes to the inventory, i.e. devices removed, will impact net offsets claimed as illustrated in Appendix A.3. The list will also help in determining what fraction of the pneumatic devices was vented and what fraction was flared. Refer to Flexibility Mechanism section and Appendix B for more details.”</p> <p>Not Applicable- This statement is beyond the scope of the protocol. This comparison would not be required because the air is metered and a gas equivalency formula calculates how much methane gas would have been vented in the baseline.</p>
4	Table 2.4	Technical	Addition	Table 2.4 SSR B7- the measured volume of the compressed air does not state any reference conditions. The volume will vary based on the pressure that the air is compressed to, so this element is important to ensure functional equivalence – suggest corrected to STP.	<p>Not Applicable- Table 2.4, density of methane had already stated that: “If this value is used all values must be adjusted for standard temperature and pressure STPs” as per other Alberta approved protocol such as the landfill gas protocol. Volumes of air will be corrected to STP to further strengthen this. (Table 2.4, variable Compressed Air Used for Pneumatic Instruments.)”</p>

				<p>[On page 5 of the definitions it mentions that the pressure is the means by which functional equivalence is established, however, no reference to the pressure of the baseline or project systems are found in the quantification tables.]</p>	<p>[Functional equivalence is achieved by using the metered volumes to establish how much gas would have been vented. Pressure is related to volume by using the ideal gas law so pressure does not require metering but rather volumes.]</p>
5	Appendix B	Technical	Comment	<p>Appendix B, pg 43, line 14. Retroactive credits do not appear to have any monitoring requirements in prior years (ie metering occurs several years after installation). There doesn't appear to be any way of assessing if the equipment actually operated in this time. It is 'noteworthy' that there would be differing requirements for historic as opposed to current practices</p>	<p>Applicable- In Appendix B, pg 43, line 14, the following paragraph will be added: "To facilitate verification of retroactive credits, the project proponent should identify the run time of principle equipment such as compressors, dehydrators, or other equipment within the facility, or provide other facility-specific supporting documentation to demonstrate continuity of operations. In the event that instrument counts cannot be developed for a facility in the past, the proponent can use the aforementioned evidence to demonstrate that a significant change to the facility had (or had not) occurred. The project developer will then use the baseline and project quantities metered during the one month metering period and adjust those using engineering calculations to reflect emissions in the unmetred period. Adjustments are based on instrument counts and vent rates from the manufacture's technical specifications. The pneumatic device's vent rate is adjusted for leak inspection and repair, and then multiplied by the complete hours of operation (i.e. 8,760 hours per year). Finally, this value is subtracted from the measured baseline as follows: Formula from protocol... This method uses measured amounts and adjustments based on a conservative approach. By assuming complete hours of operation (i.e. 8,760 per year) for the unmetred period and adding instead of subtracting the DR, the retroactive emissions are underestimated and as a result the net offsets</p>

					claims are also underestimated.”
6	Flexibility Mechanism	Editorial	Addition	This protocol does not reference the destruction efficiency of the combustion device in the flexibility.	Applicable -In the table on p. 44, parameter “%EF”, has been added to indicate destruction efficiency. The following footnote has been added for further guidance on p.46: “A destruction efficiency of 98% is typically reported in literature. Refer to Canadian Association of Petroleum Producer’s (CAPP) Guide –Calculating Greenhouse Gas Emissions (April 2003) section 1.7.3 for more guidance.”
7	Table 2.4	Technical	Policy	Table 2.4- SSR P7. The quantification methods include the GHG emissions from the consumption of electricity, which differs from other Alberta protocols which do not.	Applicable - The GHG for consumption of electricity is used in other protocols in Alberta to establish project emissions but is not included as sources of GHGs. For consistency with other protocols, the emissions from on-grid electricity have been eliminated in the Protocol Scope and Methodology (p.1&2), and Tables 2.4 and 2.5.
8	Table 2.4	Technical	Policy	Table 2.4- SSR P7. The quantification methods reference “an approved displacement factor for self-generators,” from Environment Canada, yet this emission factor could not be found anywhere.	Applicable -Any reference to self-generator has been deleted to avoid any confusion in protocol Flexibility Mechanism #1 and Table 2.4.
9	Quantification	Technical	Addition	Further, there appears to be a typo in equation #2 under SSR P7 as the ‘volume of fuel’ is never mentioned as a data point in the rows following the equation under P7 in the table. Additionally, the volume of fuel consumed does not correspond to the amount of electricity consumed by the compressed air system (ie another factor is needed to relate the proportion of electricity consumed by the system compared to the total generated at the site, not the amount of air consumed).	Applicable - In equation #2 under SSR P7 ‘volume of fuel’ was added as this was missing. Not Applicable - The intent of this formula is for electricity generated off-grid (i.e. diesel generator). For the sake of simplicity, the emissions are calculated based on the volumes of fossil fuel consumed by the generator and not the kWh produced. Therefore the variables are different in formulas 1 and 2.

Submitted: by EnCana Corporation

General Comment: The comments made here are for general grammatical, clarification errors and spelling mistakes.

Page number, Line number	Table/Diagram number	Issue/Reason for Comment	Comment	EnCana Corporation Comment
1,4			Change “applications” to “systems”	Done
1,6			Change “all” to “sometimes”	Done
1,10			Delete “equipment”, change “control” to “controller”	Done
1, 19-20			Change “natural gas pneumatic to instrument gas for control instruments” to “instrument gas to instrument air in process control systems”	Done
1, 24			Change “instruments” to “systems”	Done
1,32			Change “natural gas pneumatic” to “instrument gas”	Done
1, 36-37			Reword to “...use to compress and manage the air.”	Done
1,40			Reword to “...conversion to instrument air.”	Done
2,1			Delete line1, reword to “In this baseline scenario, instrument gas is typically sourced from the fuel supply for the facility.”	Done
2,24			Delete “and conditioning;”	Done
3, 9			Reword to “The instrument air system will replace the instrument gas system in process controls. Functional equivalence has not been compromised.”	Done with adjustments from comment # 1 from previous table
3, 29			Change “and” to “that”	Done
3,33			Change “natural gas pneumatics” to “instrument gas”	Done
3, 34			Add ...”pressure to pneumatic devices.”	Done
3, 35			Delete pneumatic	Done
5	Glossary of New Terms	Glossary	Change “Air pneumatic Instrument” to “Instrument Air” Add “pressurized” after “uses”	Done
5	Glossary of New Terms	Glossary	Delete “In this protocol.”	Done with adjustments from comment # 1, 4 from previous table
5	Glossary of New Terms	Glossary	Change “Gas pneumatic Instrument” to “Instrument Gas” Replace “compressed” with “pressurized”	Done
11		Table 2.1 P7	Add “management” after “...for the air [] system“	Done
11		Table 2.1 P4	Change “input” to “sent”	Done

			Delete "The mostly likely... carbon dioxide."	
12		Table 2.1 P16	Correct "pla[n]ting"	Done
12		Table 2.1 P16	Change "GH" to "Greenhouse gas"	Done
13, 3			Delete "pneumatic"	Done
13, 7			Change "monitor" to "meter"	Done
13, 13			Delete "and condition"	Done
13, 21			Delete "to fuel gas"	Done
13, 21-23			Delete last line	Done
15		Table 2.2 B6	Delete "Emissions from processing...during activity B10."	Done
16		Table 2.2 B6 and B7	Delete "...using various methods prescribed in this protocol."	Done
16		Table 2.1 B4	Change "input" to "sent"	Done
17		Table 2.2 P17	Correct "pla[n]ting"	Done
28		Table 2.4 Discount Rate- Technical	Reword "1. DR(%)=0 if inspection occurred \leq 1 year 2. DR(%)= 2.5 %*minimum year interval for $1 < \text{year} \leq 10$ 3. DR(%)= 25% for year > 10 Change "and" to "/" in Fuel Extraction and Processing	Done
29			Delete m^3 for G_{AIR} and kg/m^3 for G_{CH_4}	Done
32		Table 2.5	Delete all 3 rows in P7 volume, electricity, and total air produced	Done
32		Table 2.5	Move Electricity used by desiccant to P7	Done
41, 12			Change 10% to 12.5%.	Done
41, 14			Change "percentage" to "factor"	Done
43, 14			Add "... not metered and no inspection for leaks or repairs occurred."	Done
43, 17			Change "6%" to "7.5%"; change "3" to "4"	Done
43,31-32			Reword to "for gas that is combusted."	Done
45		Discount Rate due to leaks- Technical	Reword "1. DR(%)=0 if inspection occurred \leq 1 year 2. DR(%)= 2.5 %*minimum year interval for $1 < \text{year} \leq 10$ 3. DR(%)= 25% for year > 10	Done
46, 3			Change "altered" to "adjusted"	Done
53		B.3	Add "0.057" to Forestry, Construction...	Done
General			Change the yearly leak discount factor from 2.0% to 2.5% and other related calculations accordingly	Done

General			Clarify the use of the term “vent” and “bleed” throughout protocol.	Done-both have been admitted as these are interchangeable and both terms are used in industry.
29		Table 2.4	Clarify STP for G_{AIR} and G_{CH_4} , and NTP for k_{AIR} , k_{CH_4}	Done
General		All tables	Add “total” to tables to indicate facility general use i.e. “Total Managed Air”, “Total Produced Air”. Etc... Correct this in Table 2.4 Check for words that should be subscript i.e. i, electricity	Done-all tables have been updated to reflect the changes carried out, redundant parameters in table 2.5 have been deleted, “desiccant “ has been changed to “air management system”

Comment: All comments in the second table were from EnCana Corporation, so these have been corrected to improve the protocol.