

Quantification Protocol Solution Gas Protocol Technical Expert Review Meeting

March 19, 2009

1:30 – 3:30 MT

Attendees

- Andrew Read (Alberta Environment)
- Robyn Kuhn (Alberta Environment)
- Amanda Stuparyk (Climate Change Central)
- Kirby Hayes (KHI)
- Bob Mottram (Weatherford)
- David Holt (CNRL)
- Brian Ross (Nexen)
- Ron Sawatzky (Alberta Research Council)
- Hart Golbeck (Alberta Research Council)
- Bryan Szatkowski (GChem)
- Dave Karg (Devon)
- Wayne Hillier (Husky Energy)
- Christa Seaman (Canada Natural Resources)
- Andrew Higgins (Canada Natural Resources)
- Chris Caners (ICF International)
- Carrah Bullock (ICF International)

Agenda

1. Introductions
2. Why We're Here – Amanda
3. Principles to Guide Protocol Decisions/Development – Amanda
4. Introduction to Protocols
5. Review of the Solution Gas Conservation
6. Next Steps

1. Introductions

Chris opened meeting with; introduction of attendees, review of agenda and brief discussion of meeting goal.

Goal: to ensure the development of a complete, relevant, conservative, easy to use protocol for Solution Gas Conservation.

2. Why We're Here – Amanda

Amanda reviewed role of Alberta government and Climate Change Central in the protocol development, offset system and GHG emission compliance systems in Alberta.

- Alberta Environment (AE) on behalf of Alberta Government
 - AE Regulators and Policy Decision makers related to GHG emissions
 - Contracted with C3 a public/private partnership that help facilitate the protocol development process
 - C3 has been working with Chris to help develop the protocol for the Alberta process

- Alberta Environment retains all final approval
- Regulatory Background: in July 1 2007 Specified Gas Emitters Regulation: mandates that large final emitters make annual reductions
- LFE threshold 100,000 tonnes/ year, requires a 12% reduction in intensity from baselines annually
- Setting up compliance for carbon market – Demand set by 12% reduction
- Compliance Mechanisms:
 - Emission Performance Credits (EPC)
 - Fund Credits (FC) \$15/Tonne
 - **Offset Credit (OC)**
- Projects need to be implemented Jan 1, 2002 onward stems from initial climate change action plan, Rewards early action

3. Principles to Guide Protocol Decisions/Development – Amanda

- Real, Demonstrable (identify where emissions are coming from), Quantifiable, Measurable, (need to know quantity of reductions according to scientific best practice
- Clear defined ownership)
- Require third party verification, independent check against above criteria and protocol
- Credits must be generated in Alberta
- Not to be double counted, can't be used for compliance multiple times or in multiple systems
- Key Principles identified for transparency purposes
- Alberta system does not include a project validation step, this is why the protocol is essential, provides pre-validation, minimizes risk for project developers
- Current Status of Solution Gas Protocol: first round of 3 technical reviews (step 7 of 11)
- All info available at Carbon Offsets Solutions website: www.carbonoffsetsolutions.ca

4. Introduction to Protocols – Chris

- 100 facilities in Alberta subject to regulation, must report
- facility intensity = emissions/production
- If facility is below reduction intensity they receive EPC
- Alternatives to meet compliance use EPC generated in previous years, other facilities, Fund Credits (FC) or Offset Credits (OC)
- Protocols provide methodology to develop offsets
- Other systems in place, ex Chicago Climate Exchange (voluntary), European Union has system (EUETS) regulated
- Project developer uses a protocol as guidance to develop projects and quantify credits
- Protocol belongs to Alberta Environment, publicly available to all project developers
- Basic Concept:
 - Offsets = baseline emissions – project emissions
 - Difference of baseline emissions and project emissions = number of offset credits
- Determine how to measure baseline?
 - Industry standard, models, historical information, or site specific approach
 - Site specific used in this protocol
- Identify Sources
 - SSR = sources, sinks and reservoirs
 - In protocol referred to as SS or SSR
- Emissions are grouped into different categories
- Can associate emissions with certain processes

- Once sources have been identified need to determine if the source should be included in calculations
- Reasons to not include sources:
 - Conservative – amount of offsets produced is less
 - Functional equivalence – included in both baseline and project scenario

5. Review of Solution Gas Protocol – Chris

- High level review of protocol
- Identify and Assess relevant sources
- Review of Quantification process for relevant sources
- Flexibility Mechanism – other options for quantification procedures

High Level Review:

- Protocol applies to solution gas conservation resulting from oil and bitumen extraction
- Solution gas contains methane, methane GWP = 21, high emissions from venting of methane in solution gas under baseline
- Protocol can only apply to activities in Alberta, facilities not required to comply under D
- Directive 060,
- Any future regs would apply as well
 - Therefore only reductions in Alberta that would have happened otherwise would be applicable for credits
- Want to make this as simple as possible as will require project aggregations
- By applying conservative assumptions and simplifying process can aggregate projects more easily
- **Question - What if facility is applicable to Directive 060 but you are conserving beyond the requirements than Directive 060, Can you apply for credits?**
 - Protocol meant for sites that are deemed non-economically by Directive 060
 - Meant for projects beyond regulatory requirements, therefore protocol applies only to sites that do not have to comply with Directive 060
- Identification of Sources
 - Sources of emissions include; fuels used for extraction process, capture, processing, transportation.
 - Review process flow diagram – page 8
- Project Condition Process Flow (pg. 3 of draft), captures all potential sources for project
 - P1 Emissions associated with extraction,
 - P2 oil and bitumen storage
 - P3 transportation,
 - P5 venting that may occur regardless of capture system
 - P6 processing
 - P7 movement of gas
 - P8 leakage within the pipeline (exact same under baseline)
 - P9 refers to fossil fuels used during project, generic emission factors applied
 - Electricity use = amount of electricity used on site
- Building Equipment = sources used with the building and development of the site,
- Descriptions all available on page 9-10 of draft
- **Question– electricity is excluded what about electricity used to conserve gas?**
 - Electricity excluded under Alberta's system, emissions from electricity are accounted for through regulation of electricity sector
 - According to ISO 14064-2, you are required to identify all SSR associated with the project, therefore you would have to identify electricity as an SSR, can later justify inclusion/exclusion

- Baseline Condition Process Flow (pg 4 of draft)
 - Refers to all sources in the absence of the project)
 - Similar to project
 - Ends with solution gas venting – as defined as the baseline
 - B 5- to 12 identical to project flow diagram

- Identification of Baseline Scenarios (pg 11-12 of draft)
 - Options include; modeled, historic standard, industry benchmark
 - Solution gas protocol uses site specific baseline
 - In order to measure what would have happened, measure what is actually injected into the pipeline (under project condition)
 - Quantity injected into the pipe is conservative baseline measurement of what would have been vented without the project
 - Will vary from site to site and year to year
 - Justification for decision: simple measurement, most accurate option, accounts for high variability of baseline from well to well

- Measurement of vent gas
 - Currently using industry ERCB standard methods
 - Intent is to make it easy to apply, existing required measurements can be applied

- **Question – baseline condition would never assume a flare?**
 - Flare option is a flexibility mechanism
 - Protocol flexibility mechanism allows for move from flare to venting to pipeline
 - Credits would only be generated through use of increased combustion efficiency of end use technology, as methane is combusted through flare under baseline (difference in efficiency is minimal)
 - If you were flaring before and now you are conserving would include flare in baseline
 - A lot of facilities don't have the flow rates necessary to flare, that's why it's vented, otherwise flaring likely a legal requirement and therefore not applicable
 - Included as flexibility mechanism to keep protocol as simple as possible

- Identification of Baseline SS (Table 2.2 pg 12-15 of draft)
 - Very similar to project the main difference the solution gas is vented under baseline, baseline measured by measuring amount of solution gas in project that would have otherwise been vented

- Selection of relevant sources (Table 2.3 pg 16 of draft)
 - Table 2.3 review each of the different sources, include and exclude based on justification provided (P2 typo to be included, B2 to be excluded)
 - SS excluded where possible to be conservative and simple
 - Conservative by excluding sources from both baseline and project, with option to include/exclude sources that may be relevant to specific circumstances
 - Justification comes down to functional equivalence and immaterial to quantification
 - Ex 1: transportation P7, where Energy Resources Conservation Board (ERCB) requires measurement, it is close to the pipeline, any leaks would be intrinsically excluded to both project and baseline
 - Ex 2: avoid leak test by excluding leak potential from both baseline and project
 - Justification from exclusion of each source in table

- Quantification of sources

- **Question - Inclusion of SS in project and exclusion from the baseline would make the protocol more conservative, correct? Seems that you would have to include all SS in the project.**
 - In the event that you switched to solution gas rather than propane for process requirements
 - You can exclude SS in both project and baseline in the case where no additional fossil fuels (other than solution gas) used under project scenario (this would be common practice)
- **Question – Are you not capturing solution gas use in baseline?**
 - Seems really straight forward that emissions would be the same under baseline and project
 - Justification for exclusion, easier and less confusing if baseline emissions are excluded with reasonable justification (in this case solution gas is used under both baseline and project conditions, therefore functional equivalence)
- Review of equations in table 2.4
 - P1: Volume of solution gas extraction
 - Emissions multiplied by the quantity of methane by the emission factor
- **Question - Why do you need the concentration of methane?**
 - Based on other protocols, methane content varies
- **Question - Where are emission factors coming from?**
 - Other Alberta protocols, Environment Canada
 - methane content of solution gas 90%, would have to be sales quality to go into pipe
 - would want to use correct for % of methane in solution gas
 - If solution gas is always natural gas quality at injection then this factor could be used
 - This will be the same for a lot of the source calculations
- **Question – Is this what is going to be proposed to government of how these processes will be applied?**
 - Continuous metering – not practical to have multiple meters on the site
 - Not suggesting continuous metering, depending on how the metering is set up, was intended to be an annual sampling, need to be able to quantify how much is used over a given year
 - Need to know volume used over given year,
 - P1 = project, conserved state, amount of solution gas measured, but not required on every tank
 - Gross used and sales will be measured, difference is what is used on site
 - Intent is that each specific onsite used only comes into play if the project developer wants to include it or if the number of fossil fuels used is greater under the project scenario
 - In the unlikely event that you are using more fossil fuels you would have to meter each engine
 - If the project developer wants to include on-site use of solution gas in project metering of solution gas use is required to quantify emission reduction from displacing fossil fuel use, this is included as a flexibility mechanism
 - In Simple – scenario you only need to meter quantity of solution gas sent to pipe and % methane
- **Question – Can estimation procedures be used instead of metering, this is more practical?**
 - Even at large sites, individual equipment solution gas not metered, estimated and can be verified by propane bill
 - Continuous metering would still be available for gas entering pipeline (already required for gas sales)
 - yes, this can be incorporated
 - ERCB – DIRECTIVE 060, estimate methodologies are already in place

- Direct metering is not standard practice for individual pieces of equipment
- B4 – solution gas venting (pg 28 of draft): measuring the amount of solution gas injected into the pipeline
- Concern is really amount of methane, difference in amount of methane in solution important in the quantification of credits
- In the case where solution gas used in equipment you are displacing propane, these would be eligible under flexibility mechanism
 - Not calculating solution gas being vented, b/c oil gas ratios fluctuate and are only calculated on annual basis
 - Baseline – using value “injected in the pipe”
 - last two volumes should not be included
- **Question - why not include solution gas used on site?**
 - if you were to use that approach, substitute solution gas for other fossil fuels, baseline emissions will be due to propane, under project baseline emissions
 - need to clarify that amount displaced under both project and baseline conditions
 - Next draft to include all of the sources under both conditions
 - Would be better from a practical point for cost evaluation
- **Question - In column 7, would it be useful to identify where direct measurement is required by Directive 007?**
 - That will identify where measurement is already required, this is useful
- Contingent data collection procedures
 - Provides guidance for data collection where alternatives for data collection are necessary
 - Ex. Use fuel billing records instead of direct metering
 - Solution gas concentration – can use an interpolation, based on this conversation concentrations are well understood
- **Question - (table 2.5 pg 33) For B4 solution gas venting, why is methane composition 90% or lower? It could easily be that the concentration is above 90%.**
 - Purpose of 90% threshold to be conservative where methane content is not available
 - In my previous experience with protocols concentration varies widely, that is important in the quantification of credits
 - In this case since the concentration is so stable this may not be required
 - Justification was to make the protocol more conservative because you are measuring a smaller quantity in both baseline and project and therefore difference is smaller and therefore potential for offset credits is smaller
 - Only reason for default value is when measurements are not available
 - Likely not going to be the case
- Management of data quality
 - Fairly standard requirements from Alberta Environment used
 - 7 year log and quality control, likely a lot is already required through ERCB requirements
 - Can work to make these more in line with ERCB (similar to other aspects of protocol as previously discussed)
- Flexibility Mechanisms
- Designed to give project developers more options
- Ex. Alternative monitoring options
- Specific emission factors may be substituted, where you have site specific measurements
- Displacement of fuel that would otherwise have been used

- Displacing the same amount of natural gas from being used (solution gas used instead)
- Would calculate on energy basis, amount of energy put into the pipeline would displace emissions from other fuels consumed
- **Question – Does this refer to downstream or on-site?**
 - Strictly downstream
 - Consider as CO₂ emission difference between propane and solution gas
 - Assumes that reduction of total production of natural gas is occurring in Alberta
 - Suggest changing this to on-site production
 - Suggestion that downstream is also left in protocol
- Flaring allowed – only credits available would be the presumed efficiency of combustion of the flare vs. efficiency of combustion down the pipeline
 - Suggested that option to move from venting to flare should be included
 - generally would flare under regulation if it was viable, this is why it was originally not included
 - Suggest including flaring as flexibility mechanism in the event new flare technology becomes available
 - Suggests including it in the body, that way if there is a flare it is included
- Offset Aggregation - want to make sure it was understood that aggregation was an option, due to associated project costs (not required, not included in other protocols where aggregation takes place)
- Adapt to current legislation - provides for protocol to point to current legislation
- Voluntary conservation subsequently required - amount of solution gas conserved was more than regulation required, safety net for those that invest in conservation and realize they are required to conserve under regulations
 - Basis was that you would get credit for 1st year as you would not have had known that you were under requirements due to Directive 060
- **Question - Any further comments?**
 - Last two tables – unknown where they would be used
 - Tables included for convenience, not required
 - Concern that they are not correctly labeled

6. Next Steps

- Chris to integrate comments from first review and make suggested changes
- Technical review committee are welcome to provide further written comments
- New version to be provided for further comment
- Technical committee will then provide further comments
- Revised draft will be developed and technical committee will be asked if the protocol can proceed to the second round of review (Likely to occur in May)
- All members of the technical committee will be invited to next review
- Written comments can be submitted by close of business day Monday March 23
- Will incorporate comments and provide next draft for review Wednesday March 25
- Final Draft Protocol must be submitted to Climate Change Central before April 1 deadline

Summary of Comments Received from Expert Technical Review Committee on Second Draft

1.

“Just to let you know I have reviewed the documents you sent me and think the current protocol version should meet the need. In the first pass the only issue I had was there were indications that fuel used in tanks was routinely measured which it isn't, the current version allowing estimates as reported to the registry should help, although I don't think the registry checks the volumes enough to make sure the numbers reported for a given field are consistent enough. I have seen fields in the past where one operator is reporting fuel gas volumes greatly in excess of everyone else because of the way they are estimating. The registry is the easy answer though as putting meters on all those tank heater streams would be very difficult and expensive to do.”

2.

“This looks much better. My only comment is:

Section 2.2 Identification of Baseline - the first sentence of the second paragraph is kind of confusing. I suggest re-wording it to:

The baseline will be quantified via a combination of direct measure, when there are suitable measurement based data available for the applicable baseline condition, and industry-standard estimation methodologies.

Its a small change but I think the meaning is more clear.”

3.

“A few comments:

- 1) Sec. 2.1: could you define the terms “controlled”, “related”, and “affected”
- 2) Minor formatting item: Page 8 is blank – I think the figure from pg 9 should be there?
- 3) Page 10, P5: Wrong description for solution gas flaring. Should be something like “Non-routine flaring of solution gas may occur under the project condition during compressor maintenance or other scenarios. The quantity and characteristics of the flared solution gas would need to be tracked.”
- 4) Page 21: CO2 Emissions Factor: are we bound by the protocol to use the Environment Canada emission factor you stated? Since we will have site specific gas analyses on an annual basis, we would be able to develop accurate emission factors per site. Based on the typical gas composition, the CO2 emission factor would be closer to 1.9 kg/m³. The 2.389 factor you state would be high – it would be more typical of richer natural gas streams with more C₂, C₃ etc.
- 5) Page 26: Volume of Each Type of Non-Solution gas fuel: The wording under “method” should be “Direct metering or reconciliation of volumes received or purchased” and the wording under “Justify measurement or estimation and frequency” should be “Direct metering or reconciliation of volumes received or purchased are most accurate methods available to determine this volume”
- 6) Page 29: Volume of each type of non-solution gas fuel: same comment as item (5) above.”