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Minutes for Technical Review of Pump Conversion to Reduce GHG Emissions Protocol

Date: March 3rd, 2009.

Name	Organization	Title/ Area of Expertise	Contact Information
		Attendees	
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		Invitees	
Vince Elenko	EnCana Corporation	Energy Analyst	vince.elenko@encana.com

1. Introduction: Omar Hurtado, EnCana Corporation

Start of Review: 13:04

Welcome- Overview of 11 steps. We are in step 7, asked Amanda about TPP, she will explain it later. General introduction to protocol-many protocols related but not one that actually covers pumps specifically, so EnCana Corporation decided to write a protocol.

2. Why we are here, Alberta Policy Context: Amanda Stuparyk, Climate Change Central

- Alberta Regulatory Framework
- Offsets – Market in AB
- Projects start after Jan 1, 2002
- Real, demonstrable, quantifiable
- Not regulated by law
- Clearly defined ownership (verifier will seek clear ownership)
- Generated in Alberta - investment / project undertaken in Alberta
- Not double counted (only serialize on one system)
- Verified by 3rd party (chartered account/certified engineer)
- Ex-post Verification
- Protocols based on the ISO 14064 Part 2 Standard

Principles to Guide Protocol Decisions/Development - Climate Change Central

- Environmental Integrity
- Usability/Practicability
- Adapting Precedents
- Life Cycle Analysis
- Omar mentioned precedent of protocols

Amanda- TPP will be summit with protocol and TSD

3. Introduction to Protocol Omar Hurtado, EnCana Corporation

- Overview of the Protocol

- Opportunity for generating carbon offsets with this protocol arises from the direct and indirect reduction of greenhouse gas emissions resulting from the conversion of high GHG intensive to low/no GHG Intensive pumps,
- Approach to quantification - Metered data, either electricity consumption or volumes of fluid displaced.
- Layout of protocol, process flow diagrams; SS diagrams, tables, appendix.
    - Went over diagrams, compared project and baseline

<u>4. Review of Protocol: Followed the questions of the Technical and Policy Issue Summary given to reviewers</u>

- **<u>Are the project and protocol methodology and scope clear? (p.1)</u>**
    - Milos-Assume volumes are equal is baseline and project? Might not be true, new pumps are adjusted to be more efficient and therefore are smart, so baseline might be more than the actual calculated one, need to adjust it to reflect optimization. Could it be included as a flexibility mechanism? Flexibility for smartness of pumps?
    - Omar-If the volumes are lower than in baseline, it is a conservative approach, so you get less offsets but they are quantified in a conservative manner.
    - Milos- Other parameters affect pump rate.
    - Lee-Many, but monitoring too many parameters can make protocol unusable, this approach is easy and okay to use. Dates of volumes would be hard to acquire and justify the other parameters.
    - Matt-Could include as factor to take into account the reduction in offsets due to optimization.
    - Omar- Point well taken, we can include a flexibility mechanism to account for this, this factor could adjust the baseline and increase it due to optimization as a way to reward the project developer for that extra effort, could be supported by historical documents from the facility.
    - Alex- Seems there is not a quick fix to this issue, more analysis is needed.
    - Stephanie- Different volumes should be addressed in the functional equivalency, or vendor should be referenced in the functional equivalency part.
    - Milos- What about lead batteries, or instrument air, there could be double counting or dipping i.e. have gas-solar/then air project so you could use several protocol and claim overlapping offsets.
    - Omar-Lead batteries are beyond scope as these are not related greenhouse gases. As for double counting, we could include a new criteria to clarify, should be left to the verifier.
    - Matt- A person could analysis the protocols and see what protocol is the best one to get maximum offsets and do that project.
    - Omar-Agree, a facility engineer with enough knowledge could choose the best way to claim the maximum offsets, but that requires knowing the protocol system, and project are also case specific. This may be caught when auditing occurs or when the offsets are serialized I think.
    - Amanda- Not really Omar, guidance should be given to the verifier, not give them the responsibility. This may not be caught anywhere so the verifier must know beforehand.
    - Omar-Agreed, we can add a new applicability criterion to give further guidance to the verifier to spot any possibilities of double counting.
    - Milos- More greenhouse gases can be generated in the project due to electricity used, should be taken into account.
    - Omar-These are taken into account in the formulas if you use fossil fuels. I had a question about electricity use but I think I will ask it now, is on-grid electricity use a source of greenhouse gases? In our previous protocol we were told to take it out, it the generator's responsibility. So we do not know whether to include it or not. What is the policy? We can to add criteria on change of power source only.
    - Amanda- It depends on the project…but I will get back to you and let you know.
    - Milos- Change of power source limits it, we should include same source but more efficient pumps.
    - Omar- Ok, we will not limit this.
    - Matt- Carbon credits and offsets, does documentation have to be stamped by a professional for 3rd party verification and liabilities?
    - Amanda- All offsets are verified by a chartered accountant or professional engineer.
- **<u>Is the protocol applicability clear and adequate for this protocol? (p.2)</u>**
    - Omar-Use of EF-give them new name? Could be confusing. Propose change to Volume to Energy Ratio or another name.
    - Lee- Could use fuel consumption factor.
    - Omar-You can think about it and let me know by March 13th 5pm, the deadline for submission of comments. So any comments on the protocol and project methodology and scope?
    - Milos- End-of-life replacements are included?
    - Matt-What about process control pumps?
    - Omar-Process control using for example instrument air is taken care of in the instrument air protocol.

- Amanda- End-of-life replacement needs to be flushed, it will not fly, the project developer needs to show the new pumps are beyond business as usual because replacement would have occurred anyway, need to add verbiage to show why it is included, also take away the affirmation part in function equivalence, and 3rd Party will verify it.
- Alex-Put reference to EF and appendix before p.3.
- Omar-It is introduced in p.1.
- Alex-Ok, I see.
- Stephanie- End-of-life should show additionality criteria like the CDM; it would be done anyway, but needs to show it is beyond business as usual or standard practice.
- Matt- Could be shown by economic restraint, maybe add economic criteria.
- Milos- Payback criteria could be added also.
- Omar- I will analyze with Vince and add these criteria.

- **Are the flexibility mechanisms acceptable? (p.3)**
  - Went over the flexibility mechanisms
  - Omar-Any questions on the retroactive credits? Is it okay? Basically you need metered data, many pumps meter electricity or other quantities, so for projects that are already implemented before the protocol was available, they can use historical records. I know many pumps have SCADA systems or have monitoring equipment.
  - Lee-Not really, only about 10% at the most have SCADA systems or record data.
  - Omar-Point taken, as long as there is a way to show quantities in the past, retroactive credits can be claimed.
- **Is the baseline approach and quantification adequate and easy to follow? (p.11)**
  - Stephanie – How is the baseline calculated?
  - Omar- Using metered quantities in the project and back-calculating to what would have happened in the baseline using EFs. Metering of volumes of fluid or electricity is permitted.
  - Milos-What about operating conditions, seasonality? Could you use an amp meter?
  - Omar-By metering these are taken into account indirectly, i.e. methanol data collection would show 0 in summer if volumes or electricity was metered. Metered quantities reflect this and type of chemical, for verification we would specify the chemical type too. Discussed the alternatives to baseline-historic, benchmark, comparison presented in TPP. Question for Amanda-do we need to include evaluation of baseline alternatives like we did in the TPP, it this a new requirement?
  - Amanda-Need to flush the baseline justification out, this can be done by using the table from the TPP, and it is a new requirement.
  - Omar-Okay we will add this and so this will strengthen the section, thanks for clarifying, walk through Appendix, propose removing electricity emissions in project condition.
- **Is the contingency table adequate? (p.28)**
  - Amanda-Go over section 2 to 2.4 in more detail before you talk about the contingency tables.
  - Omar- Ok, went over how the baseline was calculated and the baseline we chose, a mix of comparisons and adjusted baseline, Table 2.4 the project developer can use either metered volumes of fluid displaced, volumes of fossil fuel used or metered electricity. EFs are chosen from the manufacturer's technical specifications and examples are shown in Appendix A for gas-assisted pumps; electrical pumps are easier to calculate as these are published by manufacturer, also discussed the baseline activities as related, controlled or affected. Are there any questions?
  - Alex- Are all sources and sinks included in the analysis? Is the volume of fossil fuel included as these are a source of emissions?
  - Omar- Yes, we only included sources and sinks for electricity used to power the pumps or captured vented gas and any other activities that generate greenhouse gases. These include the volumes of fuel type i used, for cases where the pump system is isolated. Also included are the emissions from fuel extraction/processing of those fuels.
  - Alex-Okay I see, thanks.
  - Omar- Explained the general overview of table 2.5; we will use a CAPP number here, if that is okay. EFs are used from manufacturer's; technical specifications.
  - Milos- CAPP is for reporting purposes and is conservative so offsets would be…. conservative?
  - Omar- Yes, it would be logical, less claim if it is a conservative number
  - Amanda- Use of CAPP is a concern; it should be used as last resort, if all fails should not to be included in contingency table, but rather in an appendix.
  - Matt-Maybe reference made to pumps of similar type.
  - Omar-Those exact words are in the contingency table, so we did cover that, good point to make as it reinforces out original approach.
  - Milos-Pump pressure effects? What if there is a pressure loss in the fuel source? Fuel compositions?
  - Omar-Metering reflect this for pump types, probably would change it anyway. As for fuel gas composition, usually done by third party as annual reporting so it is usually available anyway.

- Lee- Pneumatic pumps run on pressure so if there is no pressure; they would not function properly.
- Alex-What of other types, maybe steam pumps, I am not familiar with pumps in this is industry.
- Milos-Yes, what about this? Steam can be recovered for pumps.
- Omar- Most pumps in industry run on electricity or pneumatics, not steam.
- Lee- Yes, that is true.
- Omar- Beyond the scope, heat recovery is in another protocol already approved by AENV.
- Milos-Fuel gas driven pumps that recover the gas that is vented? Could there be emissions associated with gas re-pressurization?
- Omar-These are included, Appendix A has examples on how to calculate the EF based on manufacturer's technical specifications and the formulas allow you to take into consideration emissions associated with re-pressurizing the gas, as this is a source of emissions either from fossil fuel used to generate electricity or from on-grid electricity consumption
- Matt- As long as you can show a reduction in greenhouse gases, any type of pump should qualify.
- Omar-In any case, we will put the CAPP number in the appendix.
- Alex- EF for fossil fuels used where are these?
- Omar- In Appendix B, EFs for combustion are includes CH_4, CO_2, and N_2O.
- Alex- Okay I see.

- **<u>Is the overall approach of the protocol sound and acceptable?</u>**
  - Alex-Clarify the term PGU in Appendix A.
  - Omar-Okay I will it is an example from an EPA document and is already referenced, I will look into it.
  - Omar-Okay I will take into account all the suggestions made today and update the protocol accordingly.
  - You can submit comments by March 13th, 2009.
  - Thank you for you assistance.

End of Review 14:41

<u>5. Main Comments/Discussion Points from Review of Protocol</u>

- Volumes of fluid displaced-needs further clarification, might underestimate baseline, could add an adjustment factor for optimization as a reward as per Milos recommendation.
- Double counting, if pump conversion then instrument conversion to claim higher credits-add to applicability criteria. To make sure verifier is aware of this.
- End-of-life- needs further clarification show beyond business as usual, beyond normal pumps, top of the line, additionality as per Amanda and Stephanie's comments
- CAPP-Not really good idea, but can be placed in Appendix as per Amanda's recommendation.

<u>6. Next Steps</u>

Omar-Summary of minutes to be given out by Monday March 9th, 2009, I will send out a general email to confirm date of feedback to Omar by March 13th, 5 pm.

Monday, 2 March 2009,

Technical and Policy Issue Summary for Preliminary Protocol Review

Dear participant:

In addition to the development of the Alberta protocol document, a listing of key technical and policy issues was developed to guide discussions as part of the technical and stakeholder review processes. The following list provides a listing of the key issues for discussion. Many of the issues have both a technical and policy component.

- Are the project and methodology scope and definition clear? (p.1)

- Are the project and baseline configurations sufficiently broad as to capture the full scope of possible air conversion projects? (p.1-2)

- Is the protocol applicability adequate for this protocol? (p.2)

- Is metering electricity or alternatively the fluid displaced to establish baseline and project emissions an adequate approach? (p.2)

- Is quantification approach based on emissions factors (EF) simple to follow and adequate?

- Are the flexibility mechanisms acceptable? (p.3)

- Is the approach to claim retroactive credits acceptable? (p.3)

- Are the step by step procedures in the APPENDIX section easy to follow?

- Are the examples useful and illustrative?

- Are tables illustrative and sufficient?

- Is the overall approach of the protocol sound and acceptable?

- Is the contingency table adequate? (p.28)

Summary of Feedback and Comments Received During and After Expert Technical Review for Pump Conversion Protocol on Tuesday March 3rd, 2009

Introduction

This document contains feedback and comments from the reviewers given during and after the review up to the final submission date (Friday, March 13th, 2009, 5 pm). In order to simplify matters, the reviews name's and comments are followed by a text box with a response to those comments or suggestions

A. Modification of Protocol Based on Feedback from Reviewer during Review (taken from minutes of meeting)

- M.K. -Assume volumes are equal is baseline and project? Might not be true, new pumps are adjusted to be more efficient and therefore are smart, so baseline might be more than the actual calculated one, need to adjust it to reflect optimization. Could it be included as a flexibility mechanism? Flexibility for smartness of pumps?

We have included a Flexibility Mechanism to account for adjustments of baselines for special cases. In any case, if in the project condition the project developer is injecting less, the project emissions and hence the baseline emissions are less than the actual one, in alignment with the principle of conservativeness. The Flexibility Mechanism will allow the project developer to establish baseline emissions project developers with supporting documentation.

- S.T - Different volumes should be addressed in the functional equivalency, or vendor should be referenced in the functional equivalency part.

We have further explained this in the Flexibility Mechanism. We did not include any vendors because this may cause commercial issues to be raised and the protocol is meant to be generic.

- M.K What about lead batteries, or instrument air, there could be double counting or dipping i.e. have gas-solar/then air project so you could use several protocol and claim overlapping offsets.
- A.S - Not really, guidance should be given to the verifier, not give them the responsibility. This may not be caught anywhere so the verifier must know beforehand.

We added a new applicability criterion to give further guidance to the verifier to be wary of any possibilities of double counting or use of other protocol for claiming offsets, in particular section d of applicability criteria number 3.

- Omar-Use of EF-give them new name? Could be confusing. Propose change to Volume to Energy Ratio or another name.

We changed the name to Pump Displacement Factor (PDF) in order to avoid confusion with EF

- A.S End-of-life replacement needs to be flushed, it will not fly, the project developer needs to show the new pumps are beyond business as usual because replacement would have occurred anyway, need to add verbiage to show why it is included, also take away the affirmation part in function equivalence, and 3rd Party will verify it.

We have deleted any references to affirmation as these would be done anyway by a 3rd Party.

- End-of-life should show additionality criteria like the CDM; it would be done anyway, but needs to show it is beyond business as usual or standard practice.

- Could be shown by economic restraint, maybe add economic criteria.

- Payback criteria could be added also.

Omar-We have added further guidance for end-of-life projects based on beyond business as usual criteria in the protocol applicability section.

- A.S Need to flush the baseline justification out, this can be done by using the table from the TPP, and it is a new requirement.

We have included the table from the TPP to strengthen and comply with the requirement on baseline identification and justification.

- Use of CAPP is a concern; it should be used as last resort, if all fails should not to be included in contingency table, but rather in an appendix.

We will use it as a last resort and it is included in Appendix A.

- Clarify the term PGU in Appendix A.

We have made some clarifications for this example and the use of PGU.

- Volumes of fluid displaced-needs further clarification, might underestimate baseline, could add an adjustment factor for optimization as a reward as per Milos recommendation.

We have included this as part of a flexibility mechanism.

- Double counting, if pump conversion then instrument conversion to claim higher credits-add to applicability criteria. To make sure verifier is aware of this.

We have added further guidance to make sure the verifier is wary of this.

- End-of-life- needs further clarification show beyond business as usual, beyond normal pumps, top of the line, additionality as per Amanda and Stephanie's comments

We have added further guidance on this based on beyond business as usual criteria.

- CAPP-Not really good idea, but can be placed in Appendix as per Amanda's recommendation

It has been referenced in Appendix A.

<u>B. Modification of Protocol Based on Written Feedback from Reviewers</u>

<u>1. M.K (BP Canada)</u>

- Omar,

I just spoke with our operator out in Grande Prairie who is testing a methanol injection optimization program. Turns out their methanol injection optimization study won't be complete till next year. However in speaking to him I'm thinking a flexibility mechanism for 'pumping optimization' is important. They'll be implementing their program on a field with plungers. The plungers are cyclical and the methanol pumps would inject only when there is flow.
I believe the amount of chemical injected will be significantly less with optimization based on a hydrate curve, ambient temperature and plunger lift. How much less is the next question. I think

the Adjustment Factor would be best. But the adjustment factor is only applicable if there is pump optimization.
Regards,
M.K P.Eng

I agree, in the protocol we included a Flexibility Mechanism so the project developer can establish a baseline using historical data. The project developer can then use this to show how much fluids were displaced, independent of the project conditions. If an optimization program was used, then the historic baseline is used. This will allows for easier verification since supporting evidence is used to establish the baseline.
Thanks,
Omar Hurtado

2. S.T (Alberta Research Council)

Hi Omar,
I only had two main comments on the protocol:
- The issue surrounding end of life equipment has to be clarified. Business as usual does not qualify for offsets, the proponent would have to demonstrate that the measures go beyond business as usual. Maybe standard industry or company practice would be an appropriate way to justify.
- I was under the impression that grid issued electricity could not be included as a relevant source.

Thanks,
Stephanie

Yes, I agree, we have added additional criteria based on beyond business as usual criteria. I did not get a response from C3 concerning grid electricity.

3. B.S (EnCana Corporation)

Hey Omar,
I don't have too many comments. Mainly I strongly recommend adding to the end-of-life wording (as discussed in the review session), as it is an important feature of the protocol and should be easily handled by providing some type of proof of going above and beyond when the "efficient" pump is purchased. Also, I agree that it would be very beneficial (and valid) to have some type of factor added to the credit when we can show that we are optimizing our process as a result of installing a new "efficient" pump (otherwise we would be getting smaller credits given the baseline calculations) but I see it being very difficult to accomplish simply.
Thanks,
Brad Seipp, EIT

Ok, we have addressed this as it was also stated by Milos (optimization factor) and Stephanie (end-of-life). The current approach is simple and very conservative. If optimization occurred, the safest way to establish the baseline is using historic records. In a manner of speaking, the approach we have taken makes the project developer claim less offsets and is in line with the principle of conservativeness, although the baseline may be greater than the one calculated..

4. G.P (Petro-Canada)

Hi Omar,
I reviewed the quantification protocol and it looks good. I have a few generic comments that may or may not be addressed.

First, can operators claim offset on facilities that they no longer own? For example, if a facility was owned by a company in 2002 to 2007 and a pump was replaced in 2002 can the company get credit for the 5 years of GHG reduction? Climate Change Central may be able to answer that question.

Second, what baseline do we use: current operating or theoretical operating? By doing an audit on the pump/facility we may discover that we are over injecting methanol (for example). For the case of a sour well with no free liquids, as production declines the optimal injection point may change. Say we are grossly over injecting and we install a new pump and adjust the injection rate to fit current conditions. What is the net benefit (GHG reduction)? Optimizing a facility is almost "regular business practice". The optimal injection rate could be a moving target and could cause more work than its worth.

Thanks and great work organizing this.

Gerald

The ownership must be clear. I think it is very case specific and the past and current owners would need to reach an agreement. This needs to be sorted out legally and in consent with the two parties. Refer to SGER's document entitled "Offset Credit Project Guidance Document" (p.4) for further details.

In the body of the protocol, the net emissions reduction comes from the volume of the optimized fluid. This does not taken into account the optimization, so the emissions are conservative. In the protocol we included a Flexibility Mechanism so the project developer can establish a baseline using historical data. The project developer can then use this to show how much fluids were displaced, independent of the project conditions. If an optimization program was used, then the historic baseline is used. As long as the optimization is incremental to legislation, this would not be a problem for the protocol.