

**Technical Review Session  
October 2, 2008**

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**March 9, 2009**

**Agriculture and Forest Sludge Application Protocol Questions**

- Questions Re: Technical Background Document that was prepared (Are the exclusions adequately justified?)
  - o N<sub>2</sub>O, CH<sub>4</sub>, Reversal Coefficients, Discount Factor, qualified personnel
  - o Forestry Protocol – Assurance Factor
  
- Adjusted Baseline
  - o Does it need to apply to the carbon being added to the soil? (i.e. Does an adjusted baseline apply only to the upstream activities or to the carbon that is being sequestered as well?)
  - o What does this mean on a going forward basis? (Obviously the baseline is going to change because there will no longer be upstream activities, but

- will there still be the opportunity for soil carbon sequestration on the land basis?)
- Should there be 2 different adjusted baselines? One for upstream activities (tonnes dried/tonnes produced) and one for the soil/land application (tonnes spread/tonnes produced)
  - Is it possible to consider one full year for baseline adequate considering they produce 24 hours a day 7 days a week?
  - The mills are able to choose their baseline year based on best available data? Would 2000 be acceptable?
- Can the credit allocation period be the full 8 years (2002 to 2010)? This makes more sense based on the fact that there may not be as much benefit from this in the future.
  - Forestry Protocol
    - Being that this is not currently an industry practice should we completely eliminate the upstream activities (as they will not apply if we were going to being this activity now).
    - No adjusted baseline would be necessary because it is not an operation practice – is that correct?
  - Could a flexibility mechanism be included to allow project developers to use both (a combination) of the simple and advanced quantification approaches (i.e. use the simple approach for the quantification of carbon in the above ground biomass in the forestry protocol and the advanced approach for the soil?)
  - Is it possible to obtain funding from the Climate Change and Emissions Management Fund that the large scale emitters are required to pay into? This money is supposed to be used to develop or invest in Alberta based technologies, programs and other priority areas which I think these protocols fits. Or any other funding opportunities to offset some of the costs?

**Protocol: Quantification protocol for mechanical pulp sludge utilization projects related to agricultural application.**

1. **Introductions** – All those in the table listed above introduced themselves with the exception of Greg Branton (ANC) who spoke with the project developer on October 1, 2008 with suggestions and comments.
2. **Why We're Here – Alberta Policy Context – Karen Haugen-Kozyra (KHK), C3**
  - A. Alberta Regulatory Framework with respect to greenhouse gases
    - Alberta has established a trading system for carbon credits based on a demand and set a goal for large scale emitters (>100 000 T CO<sub>2</sub>/yr) to reduce emissions by 12%. There are three ways for large scale emitters to comply with these regulations; 1) pay \$15/tonne to a fund; 2) earn emission performance credits; 3) offsets (where a large scale emitter purchases credits from someone who is NOT a large scale emitter).
  - B. Offsets – Project Eligibility Criteria

- Projects start on or after January 1, 2002.
  - Projects need to be Real (must have specific and identifiable actions that reduce or remove one of the 21 main GHGs), Demonstrable and Quantifiable (GHG reductions/removals must be calculated or measured according to scientifically acceptable methods).
  - Not regulated by law (reductions or removals must be incremental to provincial regulations)
  - Clearly defined ownership (verifier will seek clear ownership) – There must be a clear, legal claim of greenhouse gas reductions or removals and this must be clearly sorted out prior to undertaking a project.
  - Generated in Alberta - investment / project undertaken in Alberta (Credits can however be sold outside of Alberta).
  - Not double counted (only serialize on one system).
  - Verified by 3<sup>rd</sup> party (chartered account/certified engineer)
- C. Ex Poste Verification – In the Alberta Project Cycle – Government does not validate or pre-approve a project, the project is implemented and then the credits are verified. It is a back-ended system.
- D. The Protocols are based on the ISO 14064 Part 2 Standard.
- Involves identifying emission sources and sinks upstream and downstream of the project, as well as in the baseline and project conditions.
  - Allows you to consider all the possible impacts on project and baseline condition.
  - CDM does not take that approach – developed from bottom-up where the outside project boundaries are not considered.

### **3. Principles to Guide Protocol Decisions/Development - (KHK), C3**

The Alberta Government would like the technical reviewers to keep 4 main principles in mind when weighing in on the protocol:

#### Principals to Guide Protocol Development.

1. Environmental Integrity- considering all GHG sources controlled, affected and related to the project
2. Usability/Practicability – (to balance the environmental integrity) using consistent approaches to decide what needs to be quantified in baseline and project; reasonable level of rigour and integrity
3. Adapting Precedents – set elsewhere; borrowing from tools, methodologies and approaches used in other systems
4. Life Cycle – Cumbersome, but comprehensive; as outlined by the ISO 14064-2 framework.

### **4. Introduction to the Protocol - (Slow walk through/introduction of the protocol) – Bonnie Drozdowski (BD), Alberta Research Council**

- Protocol was developed for mechanical pulp sludge utilization in the forest and for land application on agricultural land.
- Opportunity for generating carbon offsets with these protocols arise mainly through direct and indirect reductions of greenhouse gases through carbon sequestration of below and above ground biomass.

- Measurement based comparison approach to quantification, which means control areas will need to be established.
- Alberta Protocol Format; ISO 14064-2 Approach;
- Layout of protocol, process flow diagrams; SS diagrams.

**5. Review of the Protocol - BD - Sludge Utilization – Agriculture Application (Section by Section)** (More detailed run-through of the Protocol elements, basis for the flow diagrams, identification of SSs, rationale for exclusion or inclusion, quantification approaches and appendices, discussion points).

Question: Protocol Applicability (#4) – Gary (ANC) – where did the protocol requirements come from (i.e. were they developed by the protocol developer or were there requirements set by government).

Answer: – Bob (ARC) – ARC used a measurement approach which will be discussed later.

Question: What does related/controlled/affected mean in terms of the project

Answer: KHK (C3) / BD (ARC) Related – SS generally upstream of project - Controlled – Project developer has control over, on the site – Affected – Downstream of project activity having an impact (i.e. city offsets for transit infrastructure affected traffic congestion (less due to increased ridership) then due to that, people start driving more  
\*\*Add to definitions in protocol

Question: Tom (AB Ag) – Protocol layout – It is more intuitive to have the baseline before the project in the flow diagrams, however it is vice versa in the document, is there a reason for this?

Answer: KHK(C3)- this is the required Alberta standard format for the protocols.

KHK (C3)– Process Flow Diagram Project & Baseline conditions – Identification and inclusion of Fuel Extraction/Processing and Fuel Delivery (can be classified as Related)

\*\*Include in relevant sections

Section 1: Protocol Applicability

Question: KHK (C3)– are the 1999 guidelines the newest available?

Answer – ARC – yes, they have not been updated since

KHK (C3)– Add sufficient documentation that are dated and time-stamped to prove operational records if claiming offsets from 2002 onward.

Protocol Flexibility:

Suggestion: Tom (AB Ag) – Protocol flexibility: Number 1- add farm operators as they may choose to use multiple projects for offsets.

Section 2: Baseline Figures/Processes

Suggestion: KHK (C3): Incorporate table completed in technical protocol plan which justifies the approach for the assessment of the baseline scenario and include in section 2 of the protocol.

Question: Tom (AB Ag) Table 2.1. P17 – Above Ground Carbon – question of yield and carbon content to be measured? BF (ARC) it could be estimated (~45-50%) rather than measured using convergence factors already developed – Change to estimated –

\*\*KHK (C3) questioned whether this is a best practice guidance (quantifying above ground biomass) and needs to confirm and will get back to group – ARC has actual measurements on removals and quantification to back-up increased yield, however C3 wants to ensure this measurement will not result in double counting.

Question: Ted (SRD) – requested clarification as to why yield need to be excluded as a benefit. KHK (C3) is going to consult best practice guidance - Kyoto protocol 3.33, National Inventory committee, recognition at international level.

Question: Tom (AB Ag) P18 (Table 2.1)– What is meant by tracking? depth? whole profile?  
When sample: start and end of project?

Answer: BF, BD (ARC) – soil will be sampled to the depth of incorporation after application (not directly after application – 5 to 6 years after application at the end of the credit allocation period). The receiving soil is sampled prior to sludge application to calculate the difference after sludge application.

\*\*will reword for clarification

Concept of a model for quantification was discussed as opposed to the measurement based assessment being proposed, and BF (ARC) listed the shortcomings of a model based approach (Many variable inputs such as farming practices (tillage, pesticide, farming equipment, etc), crop species, soil type, climate, etc) and explained why the model approach would be more complicated and less rigorous scientifically.

Section 2 Table 2.2 (Baseline SS's).

\*\*ARC – will incorporate all changes from Project SS table/discussion

Section 2 Table 2.3 (Comparison of SS's).

Concern: KHK (C3) P5/B5 – justification for exclusion needs more thought. It is not enough to say short hauling distances for justification of excluding transportation as it would be very difficult to defend. A threshold could be calculated for a distance that would have negligible greenhouse gas emissions and this would need to be stated in the applicability section, otherwise, sludge loading and transportation should be included in the quantification. (See Biofuels and landfill gas protocols for examples).

Concern: Tom (AB Ag) P6 – functional equivalence of fertilizer transportation; P14-15 & B14 – Functional equivalence of baseline fertilizer application?

It is not clear that one application of sludge would be equivalent to one application of synthetic fertilizer. Has there been research conducted to confirm this? What types of emissions are seen with the sludge application.

ARC: Calculations/research has been not directly been done behind the N<sub>2</sub>O emissions of sludge equivalent to fertilizer application (one time application of sludge compared to 5 time application of fertilizer). ARC - measured plant available N after 5 years treated vs controlled ARC - \*\*Need to work on

-suggested that ARC discuss with federal scientists on the national emissions inventory who have done considerable work in this area.

Question: Ted (FPInnov) Is there a time constraint or time of year when sampling should be completed:

Answer: TM (ARC) – typically sampling is done in the spring or the fall

\*\*incorporate into protocol when sampling should be completed.

Question: Ted (SRD) B9-B11 – Landfill and incineration exclusion?

Answer: BD (ARC) – The practice changed prior to 2002 and is ineligible for credits as well the practice would not be considered controlled emissions onsite (on the field).

\*\* The justification for exclusion of incineration and landfilling needs to be more clear.

Section 2.5 – Quantification and Figure 2.3.

Current quantification procedures – vigorous with actual sampling and measurements

AB Ag & C3 - problem with landscape variability for soil carbon and bulk density levels by positions, need some spatial control; specify depth of sampling (deeper than incorporation? up to 30cm?)

There needs to be a qualifier in the applicability section as to what types of land/fields this protocol can be/should be applied to and how sampling should change based on land variability. It also needs to be stipulated that sample points should be GPS reference and sampling should be indicative of landforms.

Question: C3 – Is there a useful reference that could be used to address the land variability issue?

Answer: AB Ag – there is an analysis of Alberta land farms/classifications which could be used, as well as specify a geo reference.

Consider sampling beyond the zone of incorporation as the zone of impact of the sludge may be deeper than the zone of incorporation – simply state a depth that needs to be sampled.

Section 2.6. Management of Data Quality/Record Keeping

Suggestion: AB Ag - Pass the information by a verifier to elaborate of section.

**Protocol: Quantification protocol for mechanical pulp sludge utilization projects related to agricultural application.**

## **6. Introduction and Review of the Protocol - BD - Sludge Utilization – Forestry Application**

Same set up as Agricultural protocol in terms of organization therefore only a very brief overview.

- Protocol is applicable to sludge applied to juvenile forest stands as research has shown this is where the sludge has the most positive benefits.
- Measurement based comparison approach used for quantification.

Question: SRD - Figure 1.2 Fertilizer application??

Answer: BD (ARC) – The fertilizer aspect of the forestry protocol (B5/B6 and B10/B11) will be completely removed as this is not a business as usual practice.

Ownership questions – FMA (i.e. Crown land)

This is an issue that does not have a conclusive answer at this point. It is still being sorted out by the government and Ted (SRD) will keep the ARC posted on the results of the discussions.

Section 1 – no comments

Section 2

Suggestion: Incorporate Fuel usage/equipment hauling, etc into Table 2.1 (project SS) and flow diagrams and life cycle charts similar to the Agricultural protocol.

\*\*Table 2.2 (Baseline SS) was incorrect however it is organized similar to Agriculture protocol and has been updated. Any suggestions for table 2.1 will be incorporated into Table 2.2.

Table 2.3 (Comparison of SS).

P10/B10 (Fertilizer) will be excluded.

Ted (SRD) Sludge Application methods and any challenger?

TM (ARC) – Sludge is applied in the cutblocks with an aerospreader and the fuel usage for this equipment may be to be quantified and incorporated into the project condition.

Table 2.4 – Quantification Procedures

ARC – 2 calculation methods – will use Alberta regeneration standards currently being practiced and incorporate those measurements into the calculations for project and baseline.

Ag- B13/P14 – sampling depths need to be coordinated the for baseline and project measurements and land variability needs to be addressed.

TM (ARC) – the type of area that the sludge can/should be applied to has been investigated previously and will be incorporated into the applicability section of the protocol (i.e, not frozen, slopes, etc). The depth of sampling would not need to be correlated with any incorporation as incorporation is not a requirement for sludge application in the forest. The samples would need to be taken at the surface only. There would be benefits to stratification for different landforms, however the sludge would not be applied to sites with extreme topography.

Discussion around measurement of Above/Below ground measurements. By not measuring the below ground roots, this aspect maybe not be quantified.

BF (ARC) – by using expansion factors (root and shoot) for the above ground biomass it is not necessary to quantify the roots in the below ground.

SRD – Soil sampling techniques?

ARC – have data in regard to beneficial landscape application types – i.e. in drier upland areas for applicability in protocol – add some of this information into Introduction and Protocol Applicability sections

## 7. Next steps - AS (C3)

Suggestions based on meeting:

- include a section 2.5.2 – Contingent data – which could be used to define data that is acceptable for historical sludge application (i.e. truck haul records, time stamped contracts, etc). This information would need to include how much sludge was applied, where exactly it was applied, etc.
- In the forestry protocol include a project methodology section which describes who the protocol is applicable for and what types of areas the sludge would be appropriate to apply to.

- AB protocol review process
  1. ARC – incorporate suggested changes and circulate to group
  2. Need to reach consensus and there are no sustained objections to protocols to move forward.
  3. Submit protocols to C3 and Alberta Environment by NOVEMBER 15/08.
  4. Submit Technical Protocol Plan prior to Nov 15 protocol submission.