

C3 – Energy. Ideas. Change.

Stakeholder Review of Draft Quantification Protocol on the Capture of CO₂ and Storage in Deep Saline Aquifers

Thursday, Jan 19, 2012 9:00 AM - 11:00 PM MST

Webinar / Teleconference

The focus of this webinar will be to discuss and gather feedback on technical/eligibility/applicability approaches laid out in the draft protocol. The developer/sponsor will present on all aspects of the protocol and considerations throughout development. This webinar is an opportunity for all stakeholders to review and comment on the draft protocol. Any and all comments are an important aspect of the development process for the Alberta Offset System, and an opportunity for everyone to give feedback and help shape Alberta quantification protocols.

Agenda

1. C3 Introduction to process and webinar format and Alberta Environment and Water notes.
2. Protocol Developer/Sponsor discussion of draft protocol and development.
3. Wrap-up and next steps.

Minutes

1. Introductions – C3

C3 – Our Role

Our vision is a world powered by efficiency and clean energy and we work to strategically remove barriers hindering that transformation.

C3 assists Alberta Environment and Water (AEW) in delivering the offset system by:

- Providing access and operation of the Alberta Emissions Offset Registry (AEOR)
- Providing information and outreach
- Facilitating protocol development
- Informational support through development and maintenance of the Carbon Offset Solutions website
 - www.carbonoffsetsolutions.ca

CCS protocol development to date – process

- Intent to Develop a Protocol – Mid 2011
- Three part technical Review – Fall 2011 (Minutes online)
- Public Posting Period – December 12, 2011 – January 12, 2012
- Stakeholder Webinar – January 19, 2012

ISO 14064-2 Principles

1. **Relevance** - select GHG sources and sinks, emission factors and formulae appropriate to the environmental integrity of the protocol.
2. **Completeness** – should consider all relevant GHG emissions and removals. Relevant information used to support decisions made in the quantification process should be transparently documented.
3. **Consistency** - to ensure meaningful comparison of GHG-related information. In particular, like emissions need to be compared in baseline and project scenarios – ‘Functional equivalence’.
4. **Accuracy** - reduce bias and uncertainties as far as practical; rely on IPCC and National Inventory methods as much as possible.
5. **Conservativeness** - conservative assumptions, values and procedures are used to ensure that GHG

emission reductions or removal enhancements are not over-estimated.

6. **Transparency** - present your calculations, assumptions and decisions in a clear, upfront manner that facilitates review by reviewers, interested parties, verifiers - ultimately Alberta Environment will need this to accept the protocols.

AENV's Expectations on Protocols/Process

- Meets regulatory requirements
- Meets policy/program objectives
- Calculation methodologies appropriate
- Protocol is additional to BAU and regulatory requirements
- Appropriate stakeholders being consulted
- AENV – due diligence with member Depts/Agencies

Principles to Guide Protocol Decisions/Development

- would like reviewers to keep 4 main principles in mind when weighing in on the protocol:

Principals to Guide Protocol Development

Environmental Integrity

- Considering all GHG sources controlled, affected, and related to the project

Usability/Practicability - reasonable level of rigour and integrity – realistic, using consistent approaches to decide what needs to be quantified in baseline and project

Adapting Precedents – precedents set elsewhere, usage in other systems

Streamlined Life Cycle Analysis – Completeness as outlined by the ISO 14064 framework –

- 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

2. Introductions – Alberta Environment and Water

This is a new format for us, a webinar, so feedback after would be welcome to see how the process and format work to review this protocol.

AEW stresses the importance of the verifiability of the protocol and transparency of the processes and approaches laid out in protocol.

Feel free to ask questions throughout.

Questions and comments will also be accepted until mid-next week on protocol.

3. Introduction – Protocol Developer (Keith Driver, Leading Carbon, JP Jepp, Shell)

Presentation Outline:

- Background
- Project Type Description
- Protocol Scope & Applicability
- Project & Baseline Conditions
- Flexibility mechanisms
- Alberta Offset System Eligibility Criteria
- Quantification Methodology
- Example Calculation

- Questions

CCS Protocol Developer to date

- Industry TSD
- Technical working group:
Consultants, NGO's (Pembina Institute), Academics, Government (AEW, NRCan), Industry experts
- Iterative process

Seed Documents

- "Technical Seed Document for the Capture of CO₂ and Permanent Storage" Sept 2011
- World Resources Institute, *CCS Guidelines*, 2008
- IPIECA, *Part II: Carbon Capture and Geological Storage Emission Reduction Family*, 2007
- Pew Center, *A Greenhouse Gas Accounting Framework for Carbon Capture and Storage Projects DRAFT*, 2011
- AOS, *Quantification Protocol for EOR*, 2007

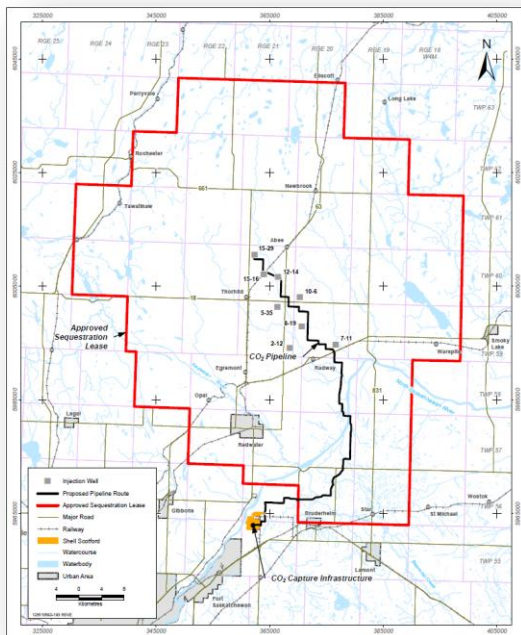
Technical Reviews

- 1st technical review – Sept 2011
- 2nd technical review – Oct 2011
- 3rd technical review – Nov 2011
- Additional stakeholder meetings

Comments from Protocol Sponsor

Protocol was developed not just for one specific project but tried to cover any potential CCS projects in general.

About the Quest project:



Capture and Compression

- Up to 1.2 Mt CO₂ captured / per year

- CO₂ > 95% purity

Pipeline

- 12 inch line; about 80 km length
- HDD North Saskatchewan River
- Line-breaks-15 km spacing (maximum)

Disposal Scheme

- 3-8 wells
- Saline aquifer over 2000m depth
- 39+ townships Area of Interest

MMV Program

- To demonstrate conformance and containment of disposed volumes

Going through both federal and provincial approval processes. ERCB process hearing in March 6th.

Q. What is a line break?

A. This is a break in the underground portion of the pipeline where it comes to the surface. A line break is an above ground valve to allow isolation of the pipeline in case of an emergency or other shut down situations.

Q. It was stated that the CO₂ would be greater than 95% purity, what other impurities are?

A. This could be further specified if needed, but generally – CO (carbon monoxide), H₂ (hydrogen), CH₄ (methane), and some trace combustion products...could get back with other specifics.

No further information required.

Q. Can you state the surface area under which the CO₂ plume will be sequestered in sq. km? Presumably that is what the red line is on map?

A. The red line demarcates the tenure area Shell has received – not the radius of CO₂ plumes. The final project will include between 3 and 11 wells.

Q. Others cannot drill in that area? Yes the tenure rights provide exclusive access to the zone of interest. Others could be granted approval to drill into other upper zones.

Review of the Protocol

- **Initiating entities:** Shell Canada Energy (60%), Chevron Canada Limited (20%), and Marathon Oil Sands L.P. (20%) are planning to implement a carbon capture and storage project (“The Quest CCS Project”)

1.0 Offset Project Description

The opportunity for generating carbon offsets arises from the **direct disposal (permanent sequestration)** of CO₂ from an industrial facility into deep saline aquifers.

- These volumes of CO₂ would normally have been emitted to the atmosphere, in Alberta
- Source: CO₂ source is from an industrial facility operating a primary process
- Capture: The carbon capture facility applies a capture technology that uses chemical solvent
- Transport: Pipeline network from the carbon capture facility to the injection sites
- Storage: Injected CO₂ is trapped within the pore spaces of the deep saline aquifer.

1.1 Protocol Scope

To demonstrate that a project meets the requirements under this protocol, the following applicability criteria must be met:

- The Project capture CO₂ directly from industrial facilities
 - o **Industrial facility** is one that produces anthropogenic GHG emissions resulting from a

- primary process
 - **Primary process** manufactures a primary product
 - Example: hydrogen production for bitumen upgrading
- The Project injects CO₂ into a deep saline aquifer capable of permanently storing CO₂ emissions. Applicants must have both:
 - Approved **Carbon Sequestration Lease** in accordance with the *Mines and Minerals Act* and the *Carbon Sequestration Tenure Regulation*
 - **Directive 65** approval for a CO₂ storage scheme from the ERCB
- The Project must be in compliance with all operating permits and relevant regulations in Alberta
 - Ex: Directive 65, 51, 7, 17 & 20
- The quantification of reductions achieved by the project is based on actual measurement and monitoring
- Metering of injected gas volumes takes place upstream of the wellhead and as close to the injection point as is reasonable
- The Project meets the eligibility criteria stated in section 7.0 of the Specified Gas Emitters Regulation

SGER Regulation – Eligibility

Alberta Offset System Criteria (as implemented by protocol)	
Real	Project must occur in Alberta and must be implemented according to ministerial guidelines
Not required by law	Only those projects that are not required by any applicable regulation will be eligible for crediting
Start Date	Must result from actions taken on or after January 1, 2012
Demonstrable and quantifiable	Project emissions determined using actual measurement and monitoring
Ownership	Have clearly established ownership including, if applicable, appropriate documented transfers of ownership from the land owner to land lessee
Counted once	Offsets can only be counted once for compliance
Verifiable	All credits must be verified by a third-party

Only deviation as listed in the protocol in regard to standard Regulation criteria is on project start date – prescribed as January 1, 2012, as there are no projects that would have been implemented prior to that timeframe as well as meeting new criteria government has set forth for offset system. Also, CO₂ must come from an industrial facility in Alberta.

Process Flow Diagram for Project Condition (see presentation slide)

- Does not claim for any activity at the regulated facility (which is upstream of project)
- The offset project is downstream of the regulated facility as shown by the dashed line in Figure 3.

2.0 Project Condition

Project condition activities:

- GHG emissions (historically emitted to atmosphere) are captured from an industrial facility
- Carbon capture facility processes the waste gas stream and captures CO₂ using chemical solvents
- CO₂ is compressed and transported to injection sites
- Injection and permanent storage in deep saline aquifer

Process Flow Diagram for Baseline Condition (see presentation slide)

- Is straight forward – facility emissions that have been reported historically

3.0 Baseline Condition

- The baseline scenario is the continued practice of emitting CO₂ to the atmosphere from industrial facilities operating a primary process

Projection-based baseline condition

- Baseline emissions are quantified using direct measurements of the quantity of CO₂ that is being injected into the deep saline aquifer
- Metering occurs directly upstream of the wellhead
- Justification:
 - Direct measurement allows for the highest level of accuracy
 - Dynamic in approach

Direct measurement prevents over-under estimation.

Q. Could there be a chance that the injection of CO₂ would have been economically advantageous over the baseline and therefore how do we know the project is really additional to what would have occurred?

A. Since the CO₂ is booked as an emission at the regulated facility, it seems that if it were economically feasible to inject any vented CO₂ it would have been done to reduce the compliance obligation. Considering venting of the CO₂ as the baseline condition then makes the case that the capture and injection of CO₂ would be additional.

Q. What about a case where the benefits of injecting the CO₂ have been occurring, as opposed to baseline venting – can we exclude possibilities where injection is the baseline condition?

A. If it is a previous injection project, by definition it would not apply to this protocol. There is a provision in the protocol to demonstrate venting in the baseline (the tie in of Enhanced Oil Recovery (EOR) or Acid Gas Injection (AGI) schemes do not apply as they are not into deep saline aquifers.

Q. If infrastructure for EOR is in place and is now used to put pure CO₂ underground, could this source of CO₂ apply?

A. There are a lot of unknowns in relation to potential CCS projects. We have tried to anticipate most general cases and made the protocol inclusive of them. Therefore, the protocol applicability must be met. Any deviations from the protocol must obtain Alberta Environment and Water approval to allow applicability with this protocol. The deep saline formation requirement along with the requirement for CO₂ to come from an industrial facility would most likely exclude this scenario.

Q. Slide 12 baseline: direct measurement at well head is of great accuracy. the direct measurement at the wellhead is of great accuracy. How do you account for CO₂ lost between the inlet to the Capture Facility and the well head injection points unless you continuously measure the inlet stream?

A. The CO₂ is booked as an emission at the regulated facility in the compliance report. The CO₂ sent offsite is also reported. Any emissions between the facility boundary and the injection well

measurement are accounted for in the facility SGER Report. Venting the CO₂ is the baseline condition.
Note: What is credited is what is actual injected less the project emissions.

Q. Elaborate why AEW is using the offset route for this project type with the development of an offset protocol as opposed to other mechanisms, such as the Emission Performance Credits (EPC) route?

A. Alberta Environment and Water understands that although there can be multiple different situations at regulated facilities, it was determined to be a way to tie the reduction/credit at the point of disposal – and encourage the development of CCS, which is a priority.

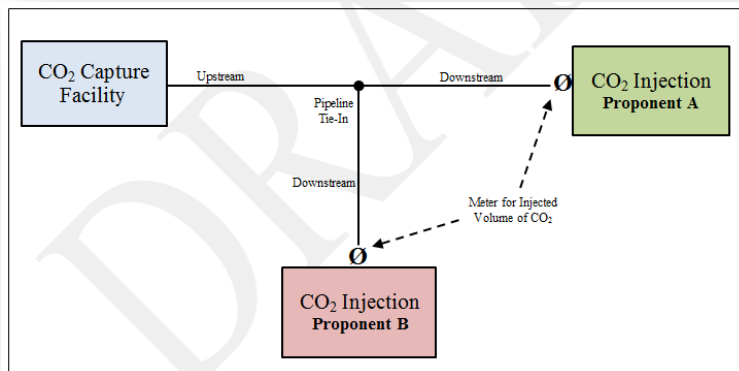
If EPCs were the incentive mechanism, they would be discounted right off the bat (12%) so to encourage implementation and investment, offsets were assessed to be one of the viable options. It also separates the regulated facility as offset projects cannot be conducted at regulated facilities.

It makes sense to report the additional parasite emissions needed for the capture of CO₂ at the facility level as it ensures they will be captured at one point in the system.

1.2 Flexibility provisions

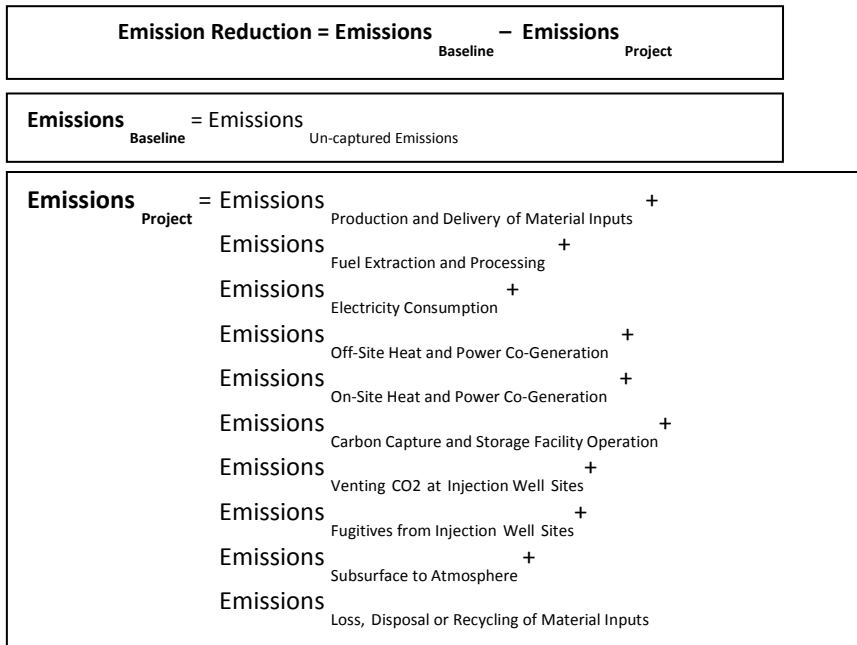
- Injection of CO₂ by multiple proponents:

- In the case of a CO₂ system or network, all emissions from that network would have to be accounted for in the project condition.
- A system emission factor may be applied whereby the project emissions are prorated proportionally across each project proponent participating in the network.



4.0 Quantification

Volume of CO2 would have been released to the atmosphere.



SAMPLE CALCULATION IS A SNAPSHOT OF A HYPOTHETICAL YEAR BASED ON PREVIOUS DATA

Baseline	B1 – Un-Captured Emissions	1,080,000 t CO_{2e}
	Σ Emissions Baseline	1,080,000 t CO_{2e}
Project	P4 – Production & Delivery of Material Inputs	740 t CO_{2e}
	P5 & 6 – Fuel Extraction & Processing	14,893 t CO_{2e}
	P8 – Electricity Consumption	30,735 t CO_{2e}
	P9 – Off-site Heat & Power	26,484 t CO_{2e}
	P10 – On-site Heat & Power	26,484 t CO_{2e}
	P11 – CCS Facility Operation	35,000 t CO_{2e}
	P18 – Venting at Injection Wells	1,080 t CO_{2e}
	P19 – Fugitives at Injection Wells	108 t CO_{2e}
	P20 – Emissions from Subsurface	0 t CO_{2e}
	P21 – Loss, Disposal or Recycling of Materials	79 t CO_{2e}
	Σ Emissions Project	135,603 t CO_{2e}
	Baseline – Project	944,397 t CO_{2e}

*Data based on Shell Quest draft SMART Lite Analysis

Each data point is listed and detailed in protocol. Any deviations from the protocol quantification methodology would need specific approval from Alberta Environment and Water.

Q. Slide 14 Quantification Methodology: will specific emissions from off-site heat and power generation in

general be quantifiable? Grid electricity, not specifically named, could come from any generating source (coal, gas or renewable energy)?

A. AEW has prescribed the emission factor for grid electricity and it will be accounted for through direct measurement.

4.1 Quantification Methodology

Is detailed in the protocol – comments can be submitted.

5.0 Data Management

Project Monitoring Plan

- The proponent must establish a comprehensive monitoring plan that includes methods to measure and quantify project data such as:
 - ✓ Incremental energy inputs required to capture, transport, inject and store CO₂
 - ✓ Quantity of CO₂ emitted from the capture site (un-captured CO₂)
 - ✓ Quantity of CO₂ input into the CO₂ transport pipeline
 - ✓ Quantity of CO₂ sold to third parties (if any)
 - ✓ Quantity of CO₂ injected into each well in the deep saline aquifer (metered at the wellhead)

Measurement, Monitoring and Verification Plan

- The proponent must demonstrate that an MMV plan has been prepared and approved in accordance with Alberta regulatory requirements.
 - The MMV plan is to be submitted as part of the tenure application under the Mines and Minerals Act, as amended by the Carbon Capture and Storage Statutes Amendment Act.
 - The Quest CCS project has an extensive and thorough MMV plan (over 100 pages), available on the Shell website.
- MMV is not solely focused on the GHG sequestration, but also to confirm the stability of the storage complex and is project specific.
- The other protocols that may be affected by this protocol (i.e EOR and AGI) will be reviewed and may be updated to reflect the specifics in the CCS protocol.

Q. How is SGER being managed so that we are aware of GHGs being injected being brought back to reporting (not captured in protocol and SGER boundary is not covered under scope of reporting (injection facilities))

Clarification—what happens to fugitives in pipe at broader level accounting:

- Regulated facility report all emissions as go off site (already accounted for as vented, or combusted or fugitive, etc.) and the volume transferred off site is also reported.
- Project has to deal with emissions associated with energy use within the project..
- The offset credit is the net of the injected volume minus the project emissions.

Liability:

- Upon obtaining a closure certificate after completion of injection activities, liability is transferred from the project proponent to the GoA.
- The project proponent retains liability for all climate obligations resulting from events occurring during project execution and during the closure period prior to issuance of the closure certificate.
- The GoA is developing policy guidelines on climate CO₂ liability for the post closure period and will update the regulation.

Clarification – liability stated in the three periods (timeframes) presented above –

1. Operation period – This is the project condition where the GHG’s are captured, compressed and injected ;
2. Closure period – There is no longer active injection but MMV is ongoing and liability is still with the project proponent; and
3. Post Closure Period – after to the Government issues a closure certificate and liability is transferred to the Government.

Q. Does the liability that is passed to government include the CO2 offsets? That is, is the ongoing regulatory framework assessment (RFA) work discussing the ‘climate liability’ (if a Large Final Emitter purchased some offset credits and then at year 50 there was a reversal of the CO2, where would liability lie?) who is taking this on in the post closure period, from regulated facility perspective.

A. This and other details are being worked on in the Regulatory Framework Assessment review, which is assessing current regulation and addressing gaps where the new activity of CCS may fall through.

Context – (RFA) Regulatory Framework Assessment – government, industry, tech, policy, addressing gaps in regulatory framework specifically in relation to CCS.

Q. Questions for end of presentation: what are the unit and indirect CCS facility upstream annual emissions (t per m3 of fluid; and t per year) for (i) make-up amine? (ii) make-up glycol?; (iii) make-up boiler feedwater? and (iv) overall - as % of captured CO2?

A. Very specific technical question to facility, a bit out of scope for protocol discussion, JP Jepp offered to respond to the question offline. This has been estimated and it has been reported and posted on Shell website.

Q. What about additional emissions – will they be accounted for in protocol?

A. They are accounted for in net calculation of reductions

Reversals:

Sources and Sinks in the protocol provide mechanisms to quantify reversals (see Section 3.1) and Appendix D provides a method for accounting for uncertainty in the quantification of reversals.

Using best practice guidance to account for reversals - Have to account for the outside bounds (maximum uncertainty of 7.5% over the reporting period. If any emissions leaked or vented could be estimated within +/- 7% then the estimate can be used. Appendix D of the protocol is provided as a reference of best practice guidance, for further information.

RECAP OF SOME KEY ISSUES THAT HAVE BEEN ADDRESSED

Description of Issue	Response to Issue
Scope: CO ₂ Source - Changed from industrial process emissions → industrial facility in Alberta, operating a primary process	Agreement to expand scope and broaden CO₂ sources through discussions between Shell and AENV.
Scope: CO ₂ Storage - Changed from non-hydrocarbon producing formations → deep saline aquifer	Policy decision by AENV to tie storage to Carbon Sequestration Tenure Regulation and Directive 65

Glossary of terms - Glossary needs to describe terms such as: Deep saline aquifer, permanent storage, primary process, primary product, trapping mechanisms	Key terms that were added, see section 1.4 of the protocol.
CO ₂ Injection by multiple proponents - Make sure the project emissions are accounted for in the case of a CO ₂ network	Flexibility mechanism was added to protocol. Project emissions will be prorated across proponents participating in the network, see Appendix C for further guidance.
Source/Sink P20 How to estimate emissions from subsurface equipment and deep saline aquifer?	Uncertainty equation is used to estimate emissions, see protocol Appendix D for guidance.
The issue of liability as it pertains to any possible reversals throughout the entire lifetime of the sequestered CO ₂	These issues are policy related and cannot be resolved at the protocol level. These issues are directed through Alberta Environment and Water to the RFA process.
Ensure no double counting for P8 – Generation of Electricity for Use by Carbon Capture and Storage Facilities	Added guidance in the protocol surrounding generation of electricity from renewable sources: “If the electricity is generated from a renewable source that has already claimed greenhouse gas benefits, the emission intensity factor will be the same as the grid emission intensity factor”.
Location of injection meter	The intent of the protocol is ensuring that metering takes place upstream and as close to the wellhead as possible. See Table 8 in the protocol for additional guidance surrounding meter placement.

6.0 OPEN FLOOR QUESTIONS AND DISCUSSION

Q. About liability – it was mentioned that the Project Proponent remains liable during project operations – what about making it possible to transfer liability after the CO₂ leaves the facility gate to transporter, compressor, etc. what happens if they are not regulated themselves...what contract might look like – ie. transfer to a 3rd party?

A. Government is not involved in contracting – protocols have not in most cases stated any contracting related information, it is the regulated facilities, that purchase the offset credits and use them for compliance, that are held responsible through regulation and reporting.

Under the SGER all GHG emissions are accounted for – once leave site liability remain with LFE unless contractual arrangements with eg. Pipeline or EOR operator to undertake that liabilityit would be up to LFEs to address contracting specifics.

Q. So it is clear that the facility emitting is the owner - what if transported out of province and injected there – baseline is venting in AB – injection outside?

A. No eligibility – the reduction has to occur in Alberta – injection, where the reduction occurs, has to occur in AB. For now, the capture facility must also be in Alberta. Will adjust the protocol to explicitly state this.

Q. Could CO₂ come from BC and be injected in Alberta would earn credits.

A. No the generation of the CO2 and the sequestration must occur in AB – the facility reporting (baseline venting) and CO2 injection (project)

Might revisit at later time – if systems link – but not now.
So baseline venting and injection must both occur in AB – YES.

**To be clarified in the protocol

Q. How long is the protocol active before coming up for review, and if you know or have a guess as to what upcoming projects would apply the protocol?

A. Protocols are automatically reviewed every 5 years for assessment to determine that the project type continue to meet Alberta Offset System requirements – can be reviewed sooner if issues are identified. Protocols will be flagged on the Alberta Environment website (i.e. like EOR and AGI Protocols are right now) due to the need to be reviewed. Projects must obtain specific government approval to bring a project forward under a flagged protocol, until the review is completed. Can't speculate on projects coming forward at this point.

Q. conversation back to alternative options to offsets for CCS – ask again – if you include the CCS component emissions at the facility level there are regulatory reduction requirements, but the parasitic load would go up. Why do you have to separate the facility and the offset...explain reasoning.

A. Recall that a regulated facility cannot generate offsets – that is the regulation itself. Also, the type of credit is important. An EPC is discounted by the reduction obligations from the regulation, so in trying to incent the CCS projects it was felt that offset credits was the best way to do that. It seemed more logical to include emissions at the facility level and reduce from injected volume for offset credits.

This allows us to hold true to the system we have set up – don't want any 'exceptions'.

No further questions on phone – webinar.

7.0 Next Steps - C3

Make sure at this point there is no sustained objection....NO RESPONSES.

Everyone's time and patience in this webinar is greatly appreciated. Please feel free to contact us if there are any further questions.

Submit comments to C3 – protocol comments email address (protocolcomments@c-3.ca). **Until Wednesday January 25th, 2012 business close.**

PROTOCOL DEVELOPER:

**Clarify in protocol Appendix D reference of where the information / guidance is from

**Clarify that both baseline venting and project injection must occur in AB

**Clarify and specify that capture facilities must be in Alberta in Protocol Applicability Section and in the Definition of *Industrial Facility*

All updates must be done in Track Changes mode and submitted to C3.

Attendees:		
First Name	Last Name	Organization
Frans	Diepstraten	Accenture
Kurt	Hansen	Green Inc.
Chris	Vander Pyl	CNRL
Rich	Wong	Pembina Institute
Kali	Taylor	ICO2N
Rob	Hamaliuk	AEW
Rick	Van Beselaere	Miller Thomson LLP
Braydon	Boulanger	TransAlta
Maureen	Yates Dootka	Chevron Canada Limited
Lance	Miller	
Michele	Morley	Spirit Pine Energy Corporation
Nannette	Ho-Covernton	Spartan Controls Ltd.
Roger	Ord	ENVIRON Canada
Magdalena	Muir	IEELS
Rick	Chalaturnyk	University of Alberta
Robert	Coulter	First Carbon Credits Corporation
Emerson	Martinez	
Hua	Deng	
Kristin	Stark	
Qinghan	Bian	Climate Action Secretariat
Andrew	Read	Alberta Energy
Michelle	Schwabe	BC Ministry of Energy and Mines
Ron	Shannon	Spartan Controls Ltd
JoAnn	Jamieson	Lawson Lundell LLP
Phillip	Ludvigsen	KPMG Canada
Hannah	Simmons	Leading Carbon
Andrew	Norden	
Malcolm	Wilson	Petroleum Technology Research Centre
Richard	Caesar	Ministry of Energy and Mines
Ronnie	Yu	
Bill	Tubbs	Spectra Energy
Guiqin	Li	Matrix-Solutions Inc.
M	Muir	AINA
Aaron	Schroeder	ICF Marbek
Roongrat	Sakwattanapong	CNRL
Darrell	Salewski	
Andrew	May	
Jiyoung	Yu	Natural Resources Canada
Livio	Nichilo	Internat Energy Solutions Canada
Tanya	Maynes	C3
Amanda	Stuparyk	C3
Robyn	Kuhn	AEW
Shan	Pletcher	AEW
Amanda	Bambrick	AEW
Bob	Savage	AEW

JP	Jepp	Shell
Kathy	Penny	Shell
Leah	Kirkpatrick	Shell
Keith	Driver	Prasino Group
Duncan	Kenyon	Hilversum Sustainability