Summary of Responses Received following the October 20, 2008 Technical Review Session

Name	Affiliation	Details of Correspondence
Technical Review Team	Various	Minutes were taken during the Protocol Technical Review session and all comments were documented on October 20, 2008.
Dwight Redden	Ashcor Technologies	Comments sent via email on Monday October 27, 2008.
Nabil Bouzoubaa	Natural Resources Canada	Comments sent via email on Tuesday October 21, 2008
Ed Kalis	Alberta Ready Mixed Concrete Association (ARMCA)	Comments sent via email on Monday October 27, 2008
Anne Weir (on behalf of CIRCA)	Canadian Industries Recycling Coal Ash (CIRCA)	Comments sent via email and fax from Anne Weir on Tuesday October 28, 2008
Vivek Bindiganavile	University of Alberta	Comments sent via email on Tuesday October 28, 2008
Brent Korobanik	Lehigh Inland Cement Limited	Comments sent via email on Thursday October 30, 2008

Summary of Responses Received following the 2nd Draft Sent to Technical Reviewers on November 4th

Name	Affiliation	Details of Correspondence
Nabil Bouzoubaa	Natural Resources Canada	Comments sent via email on Wednesday November 05, 2008
Joe Schnitzer	Ashcor Technologies	Comments received via telephone on November 07, 2008
Ed Kalis	Alberta Ready Mixed Concrete Association (ARMCA)	Comments sent via email on Monday November 10, 2008
Anne Weir (on behalf of CIRCA)	Canadian Industries Recycling Coal Ash (CIRCA)	Comments sent via email from Anne Weir on Monday November 10, 2008

Summary of Protocol Technical Review Comments Received and Changes to the Draft Quantification Protocol for the Use of Fly Ash in Concrete and Other Cement Based Products

Section and Page	Comment	Revision made / Justification
Title and Scope (throughout)	Change the title of the Protocol to be "Fly Ash Substitution in Cement Blends and Concrete"	The title of the protocol was revised to "Draft Quantification Protocol for the Use of Fly Ash in Concrete and Other Cement Based Products"
Protocol Scope Page 3	Scope should be revised from "used to produce concrete" to "used to produce concrete and cement based products." Recommend including examples.	Revised to "use of fly ash… as a substitute for cement products used to produce concrete **and other cement based products**." References to concrete have been replaced with "concrete and other cement based products" throughout the protocol.
	Include oil and gas applications in scope of fly ash usage (comment from Technical Review Session)	Included in the above definition of scope and in the baseline and project SSR descriptions for Cement Product Usage.
	The project proponent should be defined and additional clarity about the project boundary should be more explicitly stated in the protocol.	The description in the scope and project boundary was updated to discuss that "the project proponent may be from one of many positions in the fly ash supply chain (e.g. fly ash user, marketer, blender, etc.). The one commonality among all project proponents is the likely need for co-operation between fly ash producers, distributers, and users to share information." This issue is also discussed in section 2.6.
Page 4	The term SS should be defined.	The term SS was clarified in section 1.1 on page 5 as a single GHG lifecycle element.
Protocol Scope Page 4, Figures 1.1-1.4, 2.1- 2.2, Tables 2.1-2.3	Reference to baseline scenario of fly ash landfilling on page 4 should be revised to account for alternative (non-cement product) uses of fly ash	Wording revised to state that in the baseline fly ash was "used or managed differently"
	Recommend that baseline and project "disposal of fly ash" be re-worded to "Directed to Other Uses / Stored / Landfilled."	Baseline and Project SSRs for disposal of fly ash were re-named to "Fly Ash Directed to Other Uses / Stored / Landfilled" ((B22 and P22 in updated draft document) and descriptions of SSRs were revised accordingly with examples of other end uses. Table 2.3 was adjusted accordingly.
Page 5, Figure 1.1	The lifecycle GHG impact of the increased durability of concrete/ cement products	The issue of product service life is discussed in Section 2.2 and again in Table 2.3 as the rationale for functional equivalence between cement

Page 7, Figure 1.3	containing fly ash should be reflected in Figures 1.1-1.4 or in the SSR descriptions as appropriate.	product usage in the project and baseline was expanded upon.
Page 6, Figure 1.2 Page 8, Figure 1.4	Figures 1.1 through 1.4 should all include fly ash usage since some users may have already been using fly ash in the baseline scenario.	Baseline configuration updated to include the use of fly ash in the mixing facilities.
Figures 1.1-1.4, 2.1, 2.2	Concrete suppliers should be included in the process flow diagrams.	The descriptions for the SS's for Cement Product Use were revised to include concrete suppliers.
Flexibility Mechanism 3. Page 10	Reference the emission factors in Appendix B that can be replaced with site-specific ones.	Done
Glossary, Page 11	Use alphabetical order and CSA definitions wherever possible.	Definitions listed in alphabetical order.
	The definition of functional equivalence is too complicated.	The definition of functional equivalence is standard across all protocols. Refer to Section 2.5.3 of the Alberta Offset Credit Project Guidance Document at www.carbonoffsetsolutions.com.
	Recommend the use of the term cementitious product to represent the output from the cement plant for consistency with CAC's submissions to Environment Canada	This term was not used as it applies mainly to the product output from the cement plants and the Alberta SGER does not explicitly define it (SGER instead refers to "Total Production" within the cement plant fence line, but this production term does include all additives to clinker). Since this protocol uses the tonnes of fly ash as the quantification basis, it was unnecessary to define the term cementitious product as it would only be used in the development of the SGER cement production emission intensity factor.
	The definition of cement plant could be limiting if it does not include satellite and off-site blending facilities based on Environment Canada's definitions of a regulated entity.	The definition used in the protocol (for the cement production emission intensity factor) is in reference to what is included in the SGER baseline applications, which may ultimately differ from the approach used by Environment Canada to regulate large emitting industries. However, at this time the Alberta Offset System requirements are very specific that offsets cannot be created at the site of a Large Final Emitter (LFE) that emits over 100,000 tCO2e, so the protocol is structured around that

		premise. If Environment Canada's approach includes satellite facilities under the LFE definition then the eligibility of offsets from fly ash usage at the federal level may be an issue.
Table 2.1, 2.2 B19/P19	Define or clarify the terms mixing / blending facilities and concrete plant.	The SS's B19/P19 descriptions have been revised to state that mixing is the addition of fly ash to cement to meet product specifications and that this does not include grinding.
Page 12	Define related, controlled, and affected.	The Environment Canada definitions were included in Section 2.1.
Page 13, Figure 2.1	Recommend that P14 and P18 be merged into one box (SSR).	These elements were kept separate since P14 is upstream of the project (may not be controlled by the project proponent) and P18 in an activity controlled by the project proponent. This approach is consistent with the ISO 14064-2 guidelines on assessing SSRs as controlled, related or affected.
Baseline Scenario Page 18	The methods used to develop the 0.88 fly ash to cement replacement ratio factor should be more fully discussed.	Additional paragraph added to reference the details behind the referenced study as well as the US DOE study. Additional details regarding the review of this factor with actual field data were added. A sentence on functional equivalence was added for clarity.
	The fly ash to cement replacement ratio factor should be presented as a range from 0.88 to 1.2 based on discussion in the technical review. Further detail should be provided in the flexibility mechanism.	A flexibility mechanism was included to allow project proponents to propose another number other than 0.88 provided that measured values for fly ash and cement usage are available from at least one year of operation.
Page 18	Replace "blended cement product" with "cement product"	Corrected.
Page 26, Table 2.3	The protocol format is more complicated than necessary as most SSRs are excluded by Table 2.3.	The protocol formatting is constrained by the confines of the ISO 14064-2 standard and the Alberta Offset System Guidance Documents.
Page 26, Table 2.3	The justification for exclusion of P1 is confusing.	Re-worded for clarity.
	How do you know that P2 and B2 are likely to be low?	Justification for exclusion expanded.
	The justification for exclusion of SSRs associated with the transportation of fly ash should be expanded upon.	Table 2.3 was updated to provide further details on why transport related SSRs were excluded based on a US EPA lifecycle GHG analysis and sensitivity analysis that demonstrated that emissions from fly ash transportation were immaterial even when the fly ash transportation distance was up to 3.33 times greater than the cement transportation distance.

	Increased durability of concrete due to use of fly ash should be addressed in the protocol quantification equations.	As discussed in the Technical Review Session, it is conservative to exclude these emissions and it would not be practical for the project proponent to measure the change in lifecycle product durability within the time frame of an offset project with an 8 year crediting period.
Table 2.4 (B7 to B9 and B11 to B13 Cement Plant Operation)	Emission factor for cement production intensity needs to be stated	The average value from 3 years of GHG emissions data and facility production was calculated from the 2 Alberta cement plants using 2003-2006 data and the resulting emission factor of 800.16 kg CO2e/tonne of product was established. The value in the protocol was reported as 800 kg CO2e/tonne of cement displaced.
Appendix A Flexibility Mechanism	Recommend that the emissions from cement kiln dust be reviewed for inclusion in the determination of the baseline emission factor in the flexibility mechanism.	GHG emissions from cement kiln dust (CKD) disposal are not included for conservativeness. CKD is primarily an emission source when it is unutilized (e.g. landfilled) as it results in an under-estimation of total process emissions if total process emissions are calculated based on the tonnes of clinker produced at the cement plant. Typically CKD represents an immaterial source of GHG emissions as stated in the CCAR Cement Reporting Protocol which allows for the use of a default assumption of 2% of clinker (process) emissions.
Ownership	Concern that ownership Issues are not clearly outlined in the protocol, which could create an administrative burden and extra costs.	Added the following statement on page 4 of Protocol Scope: "For consistency with other Alberta Offset System protocols this protocol does not explicitly assign ownership, but instead states the minimum data collection requirements in order to adequately quantify the net GHG benefit of the project activity. It is therefore up to each project proponent to provide proof of ownership of all offsets claimed at the time of third party verification or upon request by Alberta Environment (e.g. through contracts with other participants in the fly ash distribution chain)."
Scope	Upcoming legislation across Canada which will require a reduction in mercury emissions from coal-fired power plants could impact fly ash quality due to the presence of adsorbents.	Determined to be out of scope for this protocol.

Summary of Comments Received on Protocol 2nd Draft Sent to Reviewers on November 04, 2008 and Changes Made

Section and Page	Comment	Revision made / Justification
Scope, Page 1	Revise wording in scope to say "as a partial substitute for cement (e.g. Portland Cements)"	Done
	Recommend removing the reference to production of cement in the opening line as this confuses the reader.	Done
	Recommend to change "cement clinker" to "cement" in paragraph 2 of Section 1.0 and delete the word "product" in last line of Section 1.1 paragraph 2.	Done
Protocol Approach	Add "Cement Blends" to sentence one in paragraph 1 of Section 1.1. Change "cement products" to "cement based products" in paragraph 1. Use consistent wording for "project proponent" versus "project developer."	Done
Figure 1.1	Recommend that the dotted line around P17 to P19 in Figure 1.1 be clarified.	Added "The dashed line around SS's P17, P18 and P19 represents the typical points within the fly ash supply chain at which information may need to be collected by the project proponent."
Figure 2.1, page 15	Remove "to distribution" from P16 to "Fly ash transportation to distribution"	Done
Figures 1.1-1.4, 2.1-2.2, Tables 2.1, 2.2	References to "disposal site" should be replaced by "landfill."	Consultation with fly ash producers and Alberta fly ash handling requirements indicated that other disposal options are available beyond landfills, including using the fly ash to fill in mined areas of coal mines. It is understood that landfill is a common disposal method (as stated throughout the protocol), but the protocol is generic to allow for other means of disposal in the baseline, where fly ash was not put to productive use.
Identification of Baseline pg 20	Revise wording about the fly ash to displacement ratio factor to reflect the correct assumptions.	Wording revised to say "This cement to fly ash replacement ratio factor (tonnes of cement displaced per tonne of fly ash used) is based on the assumption that concretes containing some fly ash and those that only contain cement have similar 28 day compressive

		strengths and workability. It is based on laboratory data on concrete using fly ashes from eastern and mid-western Canada, and validated by field data provided by ready mixed concrete companies from western Canada." Note that for consistency with the units in Table 2.4, the ratio factor is expressed in tonnes of cement displaced per tonne of fly ash used.
	Refer to the protocol flexibility mechanism for the use of a different replacement ratio from the 0.88.	Added the statement "Where higher replacement rates or different performance specifications are used, the project proponent should refer to the section on Flexibility Mechanisms in this protocol."
Table 2.2	Incomplete sentence for SS B17.	Revised the sentence.
Table 2.3, P21/B21	The life time GHG benefit from a longer lasting cement product containing fly ash should be expanded upon qualitatively.	Revised wording to say "In many cases the cement products containing fly ash may be more durable than the conventional cement products they replace and as such the design life of the end use application may be increased, which could further improve the lifecycle GHG emission profile of a particular project. Due to the long life times of concrete and cement product uses, there is considerable uncertainty around the magnitude of this GHG benefit."
Section 2.6	Revise wording on page 38 to include "able" and revise wording to include "producer"	Done