SUMMARY OF COMMENTS & RESPONSES ON THE DRAFT COAL MINE METHANE PROJECT PROTOCOL
September 25, 2009

9 sets of comments were received during the public comment period for the Draft Coal Mine Methane (CMM) Project Protocol, Version 1.0. In order keep this summary document to a reasonable size, some comments were edited for length, and similar comments were combined.

The comment letters can be viewed in their entirety on Reserve's website at http://www.climateactionreserve.org/how/protocols/protocols-in-progress/coal-mine-methane-project-protocol/.

Comments received by:

1. Alpha Natural Resources (ANR)
2. BCS Incorporated (BCS)
3. Biothermica Technologies Inc. (Biothermica)
4. FMC Wyoming Corporation (FMC)
5. GE Power & Water, Jenbacher Gas Engines (GE)
6. Harworth Energy (Harworth)
7. Marshall Miller & Associates (MM&A)
8. Solvay Chemicals, Inc. (Solvay)
9. Verdeo Group, Inc. (Verdeo)

Table of Contents

General Comments

1. We have heard some industry comments implying concern that the VAM projects focus on and incentify methane destruction and not the use of methane for energy purposes. We would simply like to suggest the Reserve keep this message in mind and continue to strive to find an optimum balance in policy and associated incentives. **(MM&A)**

RESPONSE: Noted. While the Reserve's primary objective is to develop protocols that ensure the accurate quantification and environmental integrity of carbon offsets, we do also strive to promote activities with environmental and economic co-benefits. Version 1.0 of the CMM Protocol allows eligibility for some types of projects that utilize CMM for energy production. Under Version 2.0 of the protocol we plan to incorporate additional beneficial use project types (i.e. projects that send CMM to commercial pipelines).

2. The Reserve has an opportunity to become the premier registry for Coal Mine Methane if we can provide guidelines showing a phased approach as to the application sequence of mine degas recovered to a pipeline first, with satisfactory additionality, followed by VAM or other CH_4 destruction (flare) second. Subsequently, capturing of gob gas from mined out areas can also be a source of methane release reductions that merit registration. It is important that the Reserve and its CMM Protocol intend to include VAM and mine degas and gob gas capture as part of the same protocol. [Please see additional information about VAM and Degas provided in the Alpha Natural Resources public comment submission.]

Somewhere in the Version 1 Protocol the Reserve may wish to consider language that says "*It is important to review the possibility of mine degas methane recovery or gas utilization prior to considering a methane destruction process for ventilation air and gob gas capture after mining in an area is completed*". **(ANR)**

RESPONSE: Agreed. As stated in the response to comment #1, we have already begun work on Version 2.0 which is intended to incorporate pipeline projects. We have also added language in Version 1.0 indicating that the Reserve strongly encourages using CMM for beneficial use.

2 The Greenhouse Gas Reduction Project

2.1 Project Definition

3. We commend the Reserve for defining mines that are eligible to use this protocol as coal mines as well as trona mines that are classified by MSHA as Category III gassy underground metal and non-metal mines. While trona mines are generally not as well known as coal mines, the Green River Basin of southwest Wyoming contains the world's largest known reserve of trona. By including trona in the set of mines eligible to use this protocol, the Reserve provides trona mines with the incentive to develop a project to destroy methane vented from our post-mine drainage system in order to generate high quality carbon offset credits. **(FMC, Solvay)**

RESPONSE: Noted.

4. While we recognize that Section 2.1 states that future references in the protocol to "coal mine methane" also include Category III gassy underground trona mines, there are two other places in the document where we believe references to "coal mine methane" should explicitly include mention of Category III gassy underground trona mines. We believe this consistency will reduce potential for confusion in application of the protocol. These are:

- Table 8.2 – In the Verification Checklist table, we recommend modifying the requirement for verifiers to "verify that the project only consists of coal mines operating within the U.S." to ensure that a project "only consists of coal mines or Category III gassy underground trona mines operating within the U.S."

- Glossary of Terms – We recommend expanding the definition of "coal mine methane", for the purposes of this protocol, to include reference to methane gas that is released because of mining activity at Category III gassy underground trona mines. **(Verdeo)**

RESPONSE: Agreed. We have revised the protocol language to more explicitly recognize the eligibility of Category III gassy underground trona mines.

5. The "Version 1.0 note to users:" indicates that projects that send mine methane to pipeline are not eligible. We suggest clarifying that this restriction refers to the delivery of gas to an offsite natural gas pipeline that is owned by a third party. We anticipate that projects that utilize gas in an on-site boiler will need to transport the gas from wellheads to the boiler using some type of pipeline. We suggest you clarify that the use of a pipeline owned by the mine to transport gas from a wellhead to a facility, both of which are owned by the mine, is eligible under this protocol. **(FMC)**

RESPONSE: Agreed. We have revised the protocol language to more explicitly define the exclusion of pipeline projects.

6. The protocol states that it does not apply to projects that capture methane from "abandoned/decommissioned" mines. If the mine is decommissioned or closed during the crediting period, projects should be eligible to generate credits for the remainder of the period, as long as the ventilation system is operating. **(Biothermica)**

RESPONSE: Noted. The reason we have excluded abandoned mines from being eligible under this protocol is because we do not feel there are sufficiently accurate methodologies available to quantify, and predict the timing of, baseline emissions (i.e., when, and in what quantities, would the abandoned mine methane (AMM) have been released in the absence of the project). Similarly, if a mine is abandoned during the crediting period (and thus the ventilation system is shut down and coal is no longer being mined) we do not have sufficient methods for determining at what rate CMM would have continued to leave the mine. Thus, baseline emissions would be similarly uncertain. For this reason, the crediting period for a project ends once the mine becomes abandoned.

7. We are pleased that the Climate Action Reserve has recognized the environmental benefits of ventilation air methane (VAM) oxidation projects and the high quality of the carbon credits that their implementation can create. However, we are concerned that the protocol leaves one subset of VAM project opportunities stranded: those with low VAM concentrations that only have access to drained methane from abandoned mines. The protocol's climate change mitigation potential clearly could be increased substantively if it were to enable the largest number of VAM

projects to be developed. We therefore request that the Reserve reconsider qualifying abandoned mine methane, at least when it is used to supplement VAM flows that by themselves are too low in concentration to support economically viable methane destruction projects. **(BCS)**

RESPONSE: Noted. The reason we have excluded abandoned mines from being eligible under this protocol is because we do not feel there are sufficiently accurate methodologies available to quantify, and predict the timing of, baseline emissions (i.e., when, and in what quantities, would the abandoned mine methane (AMM) have been released in the absence of the project). For the same reason, we cannot allow AMM that is used to supplement VAM projects to be credited under this protocol. Furthermore, as VAM projects at abandoned mines are excluded from this protocol, the situation suggested above would mean the supplemented AMM would have to come from a different mine, which is also not allowed under this protocol. All project activities that make up a project must occur at a single mine.

2.1.1 Drainage Projects

8. The sentence "The borehole(s) that make up each project's drainage system are to be defined by the project developer at the time of project submittal" seems to be too restrictive. Holes will have a relatively short operational life and their exact location may not be known at the beginning of the project. Making additional holes an expansion seems unnecessary. **(Solvay)**

RESPONSE: Because the protocol allows for flexibility in what is defined as a single project (and allows for multiple projects at a single mine), it is necessary to track what boreholes and destruction devices are defined as part of each distinct project over time. Without this requirement, verifiers would not know what systems make up the project and would not be able to confirm the eligibility of the project. The project diagram can be a simple illustration of the boreholes and destruction devices; exact locations are not necessary.

2.1.2 Ventilation Air Methane Projects

9. Biothermica welcomes the Reserve's shaft-based approach to VAM project definition, as opposed to a mine-based approach, considering ventilation shafts constitute independent emission sources. The protocol's current language does not however clearly indicate whether several shafts can be included in one project. Page 8 indeed states that "a ventilation air methane project is one that destroys methane from a single ventilation shaft" whereas page 9 reads "the project developer has the ability to combine multiple concurrent project activities into a single project". The inclusion of several shafts in one project can make practical sense when the cumulated service life of the different shafts is not greater than 10 years. Therefore, VAM project developers should have the option of including several shafts in their project. **(Biothermica, Verdeo)**

RESPONSE: Agreed. We have revised the protocol language to allow for multiple ventilations shafts to be included in a single project, if the project developer chooses to do so.

10. The Protocol states that "if VAM destruction equipment is installed at a shaft that is not part of an existing project, this is considered a new project" (pg. 9). However, the Protocol also states that a project can expand to "include ventilation shafts beyond what was included in the project

as defined by the project developer at the time of listing" (pg. 39). There is therefore an apparent contradiction between page 9 and page 39, with regard to VAM project expansion.

The Reserve should clarify the definition of project expansion. We recommend that adding new equipment to a shaft that is part of an existing project as well as including shafts beyond those that were initially listed both be considered as project expansions. **(Biothermica)**

RESPONSE: Agreed. Our intent was to allow flexibility in the definition of a VAM project; that it could be made up of one shaft or multiple shafts, based on the project developer's preference. We have clarified the language so that it states this more explicitly.

2.1.3 Non-Qualifying Devices

11. We believe the language in this section of the protocol could lead to confusion over how non-qualifying devices are accounted for in the GHG assessment boundary of an eligible project. We understand that the Reserve's intention is to accurately account for all collection and destruction that may already be occurring from any non-eligible device to ensure that no offsets are claimed for non-additional reductions. However, we suggest the following changes are made to ensure that these projects are properly accounted for:

- We suggest the Reserve define more clearly what it means to have a non-eligible project that is "co-located" at a mine. The term "co-located" should be defined.

- We suggest the Reserve clarify its language describing how emissions from a non-eligible project should be accounted for. The current language in this section alternately states that the emissions from a non-qualifying destruction device must be accounted for in the *baseline* of an (eligible) active project, and that a non-qualifying destruction device must be accounted for in the *GHG assessment boundary* of an eligible project. To accurately account for non-qualifying devices, these projects must be accounted for in both the baseline and project scenarios. Accordingly, the current language should be modified so that it consistently states that a non-qualifying destruction device must be accounted for in the *GHG assessment boundary* of an eligible project. **(Verdeo)**

RESPONSE: Agreed. We have added replaced "co-located" with "located at the same mine" and revised the protocol language about non-qualifying devices as suggested.

3 Eligibility Rules

3.3 Project Crediting Period

12. Unlike other offset programs such as the CDM or VCS, the crediting period for Reserve projects is non-renewable, based on the fact that Reserve expects offset projects to not be beyond "business as usual" 10 years from the adoption of a protocol. Biothermica respectfully disagrees with this approach, considering the following aspects:

- To preserve conservativeness, the Reserve could simply determine that a project must be additional to regulation and common practice in order to renew its crediting period;
- VAM destruction projects generate revenues only from carbon. Therefore under the current rule, if the service life of the shaft is greater than 10 years, operational costs will lead to the

removal of the equipment and methane will once more be released to the atmosphere after 10 years (Provided no regulation has been enacted).

In addition to the above aspects, it is important to note that VAM project developers already face economic and political uncertainties in the U.S:

- Federal or regional frameworks face political opposition and the announced rules are in constant evolution, notably with regard to the accepted offset project types;
- Many ventilation shafts display very low methane concentrations;
- The price of carbon credits is low;
- VAM projects are capital intensive;
- Carbon is a new commodity;
- VAM technology is very recent.

These aspects make it difficult to secure external sources of financing for VAM projects, difficulty which is only enhanced by a non-renewable crediting period. We feel the Reserve crediting period should be renewable for all non-sequestration project types. **(Biothermica, MM&A)**

RESPONSE: Agreed. We acknowledge that applying the eligibility requirements from the most current version of the CMM Protocol at the end of a project's crediting period is a sufficient way to prove ongoing additionality. We have revised the protocol language to reflect this change and allow projects to apply for a second 10-year crediting period.

3.4 Additionality

13. Biothermica welcomes the Reserve's recognition that VAM projects "may need to supplement VAM with CMM" (pg. 13). There is however an apparent contradiction in the language used by the Protocol, as the Protocol also states that a single project cannot simultaneously include destruction of methane from a drainage system and destruction of VAM. In order to clearly determine that VAM enrichment is eligible, the Protocol should state that a single project can consist of both drainage system and VAM methane destruction if the methane from the drainage system is used by the project to supplement VAM. **(Biothermica)**

RESPONSE: Agreed. We have revised the protocol language to more explicitly state that CMM used to supplement a VAM project is eligible.

3.4.1 The Regulatory Test

14. As currently written, project developers are eligible to register GHG reductions with the Reserve according to this protocol for 10 years or until the project activity is required by law, as defined by the terms of the Regulatory Test. We disagree with the Reserve's decision to not allow mine methane projects to generate offsets for the remainder of their crediting period in the event regulations are enacted that require mine methane to be legally destroyed. Mine methane projects are very capital-intensive and require multiyear payback periods in order to be economically viable. Companies will be reluctant to finance projects like these unless they have the assurance that they can generate offsets for period guaranteed upfront in order to achieve a return on their investment. The current price of carbon (through this particular mechanism) requires an investment period of 10 years or more.

Furthermore, unlike landfills, which are already subject to regulations and can predict with relative accuracy if and when such regulations will go into effect, neither coal nor trona mines are currently subject to any regulation that could impact their ability to generate offsets. As a result, project developers should be protected during their crediting period from the impact of future regulatory changes that cannot be predicted at the time a decision is made to invest capital in a project to reduce GHG emissions.

Elsewhere in its policy-making, the Reserve has demonstrated sensitivity to the importance of a fixed crediting period. For example, the Reserve decided to allow approved projects to continue to generate offset credits for the duration of their crediting period despite subsequent changes in the protocol performance standard. This decision inherently recognizes the critical value of a fixed crediting period, and the need for this certainty to enable developers to voluntarily direct capital toward emission reduction projects. [Please see the additional information provided in individual public comment submissions.] **(FMC, Solvay, Biothermica, Harworth, MM&A, Verdeo)**

RESPONSE: Noted. The Reserve assesses the risk of guaranteeing a fixed crediting period on a protocol-by-protocol basis. This is to protect the credibility and value of CRTs in the marketplace, and the reputation of the Reserve (which influences the value of CRTs in the marketplace). From an investment and market development perspective, the arguments for guaranteeing the issuance of offset credits for a fixed period are compelling. However, as a non-profit organization operating in the voluntary carbon market, the Reserve does not have the legal authority to implement mechanisms to guarantee the value of credits that are manifestly not additional (i.e., credits issued for emissions reductions that are required by law) or that would be double-counted against an emission cap. Only government policymakers and regulators have this authority.

Further, even if the Reserve were to issue CRTs after the implementation of a regulatory requirement, such CRTs would likely have very little market value, and zero credibility as emissions offsets. While the Reserve would support regulatory guarantees that uphold the value of voluntary offsets, we cannot credibly provide this sort of guarantee ourselves.

15. We note that projects that are not required by law but are determined to be common practice are no different from an additionality standpoint than projects that become required by law. As a result, just as a change in the Performance Standard Test that occurs during a project's crediting period should not affect a project's ability to generate offset credits for the remaining duration of its crediting period, neither should a change in regulation. We encourage the Reserve to revise the Regulatory Test to guarantee projects at the time of listing the ability to generate offsets for a full crediting period. **(FMC, Verdeo)**

RESPONSE: Noted. The Reserve assesses the risk of guaranteeing a fixed crediting period on a protocol-by-protocol basis. Part of the rationale for allowing a 10-year crediting period for coal mine methane projects (and not a 15- or 20-year period) is that we do not expect the performance threshold for these projects (based on common practice) to change significantly over this period. We do not believe we can make a similar conclusion with respect to regulatory requirements.

3.4.2 Regulatory Compliance

16. FMC would suggest that the Reserve consider revising this section to allow for instances where a regulatory agency finds non compliance items which are subsequently disputed or conferenced by the developer. We would propose that CRTs be issued for the project until the dispute is resolved. It can be a somewhat lengthy process to bring these types of issues to a conclusion which could have significant impact on the economics of the subject project. **(FMC)**

RESPONSE: It is one of the primary principles of the Reserve that the projects it registers are not harmful i.e., that a project has no negative social, economic or environmental consequences. Because of this principle, and the fact that the Reserve cannot rescind CRTs once they have been issued, we would be unable to issue CRTs for a project that is found to be out of material compliance per the protocol language. Please note these regulatory compliance requirements are only for project-related activities and equipment, and not the entire mine. Also, CRTs are only withheld instances of material non-compliance, i.e., where non-compliance is recurrent, or is the result of negligence or intent.

4 GHG Assessment Boundary

Figure 4.1 Illustration of the GHG Assessment Boundary

17. SSR6: For clarity, it is understood that equipment installed for the safety of the mine shall be excluded and that equipment that is required additional to that equipment, and which is required for operation of abatement or power generation equipment shall be included. Please confirm that this is the case. **(Harworth)**

RESPONSE: Yes, that it the case. We had previously specified in Table 4.1 that only "additional equipment…required by the project beyond what is required in the baseline…shall be accounted for". We have revised the language to be more explicit that emissions resulting from energy used by equipment for the safety of the mine are excluded.

5 GHG Reduction Calculation Method

18. Even though this section uses accepted methodologies and formulas it is the most difficult to understand for someone who has not been working with carbon credits. Two or three introductory paragraphs explaining the general approach and baseline methodologies used would help the layman to understand much more clearly what qualifies as a carbon credit and what does not. **(Solvay)**

RESPONSE: Agreed. We have added some additional clarifying language to help introduce this section and its intent.

5.2 Baseline Emissions

5.2.2 Methane Released into Atmosphere

19. The Protocol does not clearly indicate how the supplemental CMM used to enrich VAM is to be computed in equation 5.5 - Methane Released into Atmosphere (pg. 23) and equation 5.10 - Emissions from Oxidation (pg. 30). With regard to equation 5.10, only VAM is considered.

In order for equation 5.10 to be applicable to projects including VAM enrichment, $VAM_{flow\ rate}$ should be defined as "Average flow rate of methane entering the oxidation unit" and $PC_{CH4,VAM}$ should be defined as "Concentration of methane in the air entering the oxidation unit". **(Biothermica)**

RESPONSE: Noted. We have added language to the protocol that explains how supplemental CMM is to be accounted for in Equation 5.5, and have updated Equation 5.10 per your suggestion.

5.2.2.1 Identifying Eligible SMM

20. It is recommended that the Protocol adopts the UNECE Glossary of Terms to enable international continuity of understanding. **(Harworth)**

RESPONSE: We have incorporated some definitions from the UNECE Glossary of Terms into the protocol's Glossary of Terms. However, the UNECE does not define the term "mined through", so we have left the language as is. We welcome ongoing feedback on in this definition is appropriate and practical.

5.3 Project Emissions

5.3.3 Emissions from Destruction of Captured Methane

21. In Equations 5.9 and 5.11, which prescribe a calculation for methane destruction from eligible end uses, we suspect that the variable MDi incorrectly accounts only for methane destroyed through eligible end uses. Given that Equation 5.4 requires CO_2 combustion emissions from methane destruction occurring from non-qualifying destruction devices to be accounted for (i.e., added) in the baseline emissions, these CO_2 combustion emissions must also be accounted for as project emissions in order to correctly calculate emission reductions.

We suggest the Reserve review and modify variable MD_i so that it includes "Methane destroyed through *all end use i* (flaring, power generation, heat generation, on-site vehicle use, etc.)". **(Verdeo)**

RESPONSE: Agreed. We have revised the protocol language per your suggestion to make it clear that project emissions shall account for all end uses within the GHG assessment boundary.

6 Project Monitoring

22. Paragraph 3, Correction of Volumetric flow to Standardized flow:
Volumetric flow instruments typically standardize externally to the instrument. While some instruments with smart multi input transmitters can internally standardize, these are not particularly common. Slight reword suggested to remove implication that internal standardization

is preferred. **(Harworth)**

RESPONSE: Agreed. We have revised the protocol language per your suggestion.

23. Non-methane Hydrocarbons (NMHC):
With regard to the positioning of the flow meters and methane analyzers necessary to monitor flow rates and concentrations, the Protocol does not require specific positioning. In the same spirit, project developers should have the choice between sampling NMHC content from each drainage type separately or after the junction of the flows leading to each destruction device included in the project. This would enable project developers to determine the most effective way (technically and financially) to position their instruments while complying with the Protocol's requirements.

We recommend that the following sentence be deleted in order to give project developers flexibility with regard to the positioning of their instrumentation: "NMHC content from each drainage type within the project definition shall be sampled separately". **(Biothermica)**

RESPONSE: Noted. We do want to provide project developers this flexibility, while ensuring the requirements of the calculation methodology are met. We have revised the requirement so that sampling occurs prior to each destruction device within the project, rather than from each drainage type. This should remove some of the burden while still allowing accurate quantification of CO_2 emissions if these thresholds are surpassed.

24. The Protocol states that "NMHC content shall be demonstrated by a full gas analysis by a certified lab" (pg. 34). Noting that the Protocol does not specify which certification must be demonstrated, it is also our opinion that this requirement is unnecessarily restrictive. Therefore, NMHC content should simply be demonstrated by a gas analysis performed with equipment for which the calibration certificate is valid. **(Biothermica)**

RESPONSE: We have revised the protocol language to specify that the lab must be ISO 17025 accredited, which is in line with other lab certification requirements in this and other Reserve protocols.

25. The frequencies required for the cleaning, inspection, field check and calibration of the gas flow meters and methane analyzers (pg. 34) are, in our opinion, reasonable and well balanced. We however recommend a slight modification to the field check requirement in order to allow for the use of portable instruments for field checking methane analyzers.

We recommend that the field check requirement be restated as follows: "gas flow meters and continuous analyzers should be field checked for calibration accuracy, using either a <u>portable instrument</u> or manufacturer specified guidance, at the end of but no more than two months prior to the end date of the reporting period". **(Biothermica)**

RESPONSE: Agreed. We have revised the protocol language per your suggestion.

26. The protocol states that "all gas flow meters and continuous methane analyzers must be cleaned and inspected on a quarterly basis… and that if any field check reveals accuracy outside of a +/-5% threshold, calibration by the manufacturer or a certified service provider is required." It's unclear if the +/-5% accuracy requirement pertains to each individual piece of equipment, or if the threshold pertains to the project's system of gas flow meters and continuous methane analyzers. Requiring a calibration by a manufacturer or a certified service provider for

a specified error may be very difficult to make happen and is not practical for most mining operations. We encourage the Reserve to clarify this requirement. **(Solvay)**

RESPONSE: Noted. We have clarified the protocol language to state that the +/-5% accuracy requirement pertains to each individual piece of equipment, not the system.

27. "If a portable calibration instrument is used, such as a pitot tube or a calibrated portable gas analyzer, the portable instrument shall be calibrated at least annually at an ISO 17025 accredited laboratory." (pg. 35) This requirement is not practical and compliance would be difficult for almost all mines. **(Solvay)**

RESPONSE: This requirement is necessary to ensure reliability of the monitoring system, and is similar to what is required by other Reserve protocols.

28. Paragraph 5, Exhaust Gas Monitoring:
We refer to the requirement that exhaust gas fraction of methane is measured continuously and recorded every two minutes. Though this requirement is technically achievable, from an engineering view it is not very practicable, and would add significant excessive cost for little practical benefit. As VAM concentrations of methane and airflows are generally extremely stable, the oxidation process is as stable as the airflow entering the unit, and the purpose of exhaust methane monitoring is to verify the destruction efficiency of each unit, it is clear that continuous monitoring is unnecessary, and that a regular check is more than adequate. We would request that the balance of cost and benefit are considered to ensure a practicable solution is allowed. [Please see the additional information provided in the Harworth Energy public comment submission.] **(Harworth)**

RESPONSE: Continuous monitoring for VAM projects is considered best practice and is required by protocols and methodologies developed under other established offset programs. The Reserve may assess this requirement over time, but at this point, it is conservative to require continuous monitoring.

29. We consider the protocol's requirements in respect of methane concentration monitoring to be appropriate and practicable. We consider that the combination of transducer accuracies required for mass flow (being a combination of volumetric, methane concentration, pressure and temperature) render the proposed checking, calibration and failed calibration guidelines *impracticable* with current instrumentation technology. We must differentiate between volumetric flow, standardized flow and mass flow and then understand how the instruments would be calibrated.

We recommend that field checking and calibration requirements are limited to volumetric flow rather than to mass flow as per the protocol. Field checking of flow meters for calibration accuracy for *mass* flow is actually very difficult, especially when used to determine whether a unit requires calibration. While it may sound like a practical technique, we see difficulties in actual execution of this practice. [Please see the additional information provided in the Harworth Energy public comment submission.] **(Harworth)**

RESPONSE: Agreed. The intention of the Reserve calibration requirement is that volumetric flow and methane concentration will be measured independently, and calibrations will therefore be done on each device separately. The language on calibration has been clarified in the final protocol.

6.1 Monitoring Parameters

30. Under equation 5.10, D_{CH4}, the units are wrong. The number 0.0423 should have units of lb.CH_4/scf not tCH_4/scf. **(Solvay)**

RESPONSE: Agreed. We have corrected the units in the comment section of this table.

7 Reporting Parameters

7.1 Project Documentation

31. We would suggest that more clarity be added to the definition of a "Mine Plan," as it is listed in Section 7.1 as required documentation to submit to the Reserve. A suggested possible alternative for this line in the documentation list is, "Mine Plan/Map, illustrating a general layout of projected mine workings, including locations of gas wells/boreholes for coal mine methane projects."

A "mine plan" is a loose term that can have different meanings. Information of this type is not publicly available, as it is typically proprietary.

Furthermore, mines regularly update plans to accommodate changing business conditions, geological changes, production rates and other parameters. These changes are usually minor but can be significant dependent upon the circumstances driving the plan update. It could become onerous to provide that information each time something changes in the mine plan if that is the intent of the document language as written. **(FMC, MM&A, Solvay)**

RESPONSE: Agreed. Based on feedback received on the contents of the mine plan and its proprietary nature, we have revised the protocol language to not require that the mine plan be submitted as a project document, but rather a project diagram that illustrates how the project is defined and includes the location, quantity and type of boreholes, ventilation shafts, eligible destruction devices and non-qualifying destruction devices within project's GHG assessment boundary. The mine plan must still be accessible by the verifier, but the document will remain private.

7.3 Record Keeping

32. With regard to permits, Notices of Violations (NOVs) and legal consent orders (p40), it is not clear whether the scope of the required documentation is applicable to the project or to the coal mine. Chapter 3.4.3 on Regulatory Compliance (pg. 13) however states that "project developers shall attest that the project is in material compliance with all applicable laws". We recommend that the scope of the requirements with regard to permits, NOVs and administrative or legal consent orders be clarified in Section 7.3 as applicable to the project's boundaries. **(Biothermica)**

RESPONSE: Noted. We have revised the protocol language to clarify that the documentation is only applicable to the project, not the entire mine. That was our intent.

33. Calibrated Portable Gas Analyzer Information:
The last information requirement (pg. 40) states that the project developer should retain

information on "corrective measures taken if instrument does not meet performance specifications". In order to clarify that the instrument considered is the verified instrument and not the pre-mentioned calibrated portable gas analyzer, we recommend that the required information be labeled as "corrective measures taken if the verified instrument does not meet performance specifications". **(Biothermica)**

RESPONSE: Noted. As portable gas analyzers are not required as part of coal mine methane project monitoring, we have removed this section.

34. As mentioned previously, while FMC understands the desire to have this information available this type of information is commonly held in confidence and FMC would desire for business purposes to maintain that status. **(FMC)**

RESPONSE: Noted. The information and document listed in section 7.3 is for verification purposes and may be requested by the verifier or the Reserve, but is not made available to the public through project registration. Both the verification body and the Reserve will sign Non-Disclosure Agreements so that this information remains private. The only documents made public are listed in Section 7.1 (Project Documentation).

35. The record keeping requirement for "Copies of all coal mine operating permits, air, water, and land use permits, Notices of Violations (NOVs), and any administrative or legal consent orders dating back at least 3 years prior to the project start date, and for each subsequent year of project operation" (pg. 40) is good practice for any mining operation. However, it is not something which has anything to do with carbon credits and it is inappropriate for either the Reserve or verification personnel to have access to this information. **(Solvay)**

RESPONSE: As the Reserve has a regulatory compliance requirement as part of its project eligibility rules (see Section 3.4.3), this information is required to be shared as part of project verification.

9 Glossary of Terms

36. We feel that there is a lack of clarity surrounding definitions of what constitutes operating and closed mines. The Protocol states that it does not apply to projects that capture methane from "abandoned/decommissioned" mines (pg. 8), terms which are defined in the glossary provided on page 47. We believe these provided definitions currently lead to some confusion with regard to the eligibility of several U.S. mines. Six different levels[1] of mine activity are indeed mentioned on page 47 and it is not clear what differentiates a "non producing" or "idle" coal mine from a "closed" mine. These definitions should be clarified in order to allow for a clear determination of project eligibility. **(Biothermica, Harworth)**

RESPONSE: Agreed. We have revised the definitions and the protocol language to be more explicit about what mine types are eligible or excluded from the protocol.

37. We recommend that the Reserve clarify its definitions of "active mine", "abandoned/decommissioned mine" and "closed mine". These terms should be revised to incorporate language recognized by international experts and government bodies, including the U.S. EPA and IPCC.

[1] Active, abandoned, decommissioned, non-producing, idle, closed

The protocol states that it does not apply to projects that "capture methane from abandoned/decommissioned mines", or from a "closed mine". An "abandoned/decommissioned mine" is further defined in the Glossary of Terms (pg. 47) as "an underground coal mine that is not actively mining coal but that may be draining or venting methane gas. Abandoned coal mines are declared 'abandoned' from the date when ventilation activities cease to exist." As written, this definition of an "abandoned/decommissioned mine" contradictory; it is unclear whether a mine that is not actively producing coal but still operating the ventilation system would be considered abandoned.

In addition, we note that that the definition of an "abandoned/decommissioned mine" is also contradictory with the Reserve's definition of an "active mine", which states that "active coal mines include mine works that continue to be actively ventilated by the coal mine operator. This could include MSHA designated 'non-producing' or 'idle' coal mines." This contradiction also exists with the definition of a "closed mine", which is described as "an underground coal mine that is no longer operational but may be draining or venting methane gas"; the Protocol states that this type of mine is not eligible under this protocol.

The U.N. Economic Commission for Europe's (UNECE) Ad Hoc Group of Experts on Coal Mine Methane, which includes representation from the EPA, developed a glossary of terms in common use throughout the coal mine methane industry worldwide. This glossary includes a clear definition of an abandoned mine as: "a mine where all mining activity including mine development and coal production have ceased, mine personnel are not present in the mine workings, and mine ventilation fans are no longer operative."[2] We recommend that the current definition of an "abandoned/decommissioned" mine in the protocol be replaced with the UNECE's definition. **(Verdeo)**

RESPONSE: Agreed. We have revised the definition of active mine and built the UNECE Glossary of Terms definition for abandoned mines into our definition for abandoned mines.

Appendix B Emission Factor Tables

Table B.2 Default Destruction Efficiencies for Combustion Devices

38. In this table you show that a Lean-burn Internal Combustion Engine has a destruction efficiency of 93.6%. In fact the GE Jenbacher Lean-burn engine has the capability to destroy up to 99.5% Methane. The maximum Methane slip of our engine design is only 2.5%, meaning at a minimum our destruction rate is 97.5%. This chart should accurately state the highest level of destruction available by indicating 99.5%. This will show the highest economic potential for this method of destruction to prospective engine users. **(GE)**

RESPONSE: Noted. These default destruction efficiencies are used if the project developer chooses not to do site-specific source testing for its destruction devices, and are meant to be conservative. The default destruction efficiencies (DE) provided in the protocol are based on source test data from lean burn engines installed at California

[2] "Glossary of Coal Mine Methane Terms and Definitions" established by the U.N. Economic Commission for Europe's Ad Hoc Group of Experts on Coal Mine Methane (July 29, 2008). Available at: http://www.unece.org/energy/se/pdfs/cmm/cmm4/ECE.ENERGY.GE.4.2008.3_e.pdf

landfills to combust landfill gas. We believe the discrepancy between the DE in the protocol and the DE you present results from differences in the heat content of the fuel being combusted. Landfill gas has a Btu content of 400-600 per cubic foot, while natural gas has an average Btu content of around 1,000 per cubic foot. Depending on drainage system type, CMM can have a highly variable Btu content, ranging from similar to landfill gas (e.g., from gob wells) up to 1,000 Btu. Because project developers do have the option to source test for a more accurate DE for their project, we believe it is appropriate that the default DE be conservative, and thus at the low end of CMM Btu content variability. As source testing data for destruction devices at coal mines becomes available, we will look to updating these default DE, as appropriate.

39. A high speed lean burn reciprocating gas engine should have slippage of no less than 97.5% and a destruction efficiency of 99.5%. This would give a theoretical minimum of 97.01% overall destruction efficiency, however practically, this un-burnt slippage would be oxidized in the exhaust pre-turbo. Larger, slower speed gas engines (which require higher inlet fuel gas pressures and are therefore unsuitable for CMM) could historically have had worse slippage, but would be impracticable and non viable now as the reduction in efficiency would be considerable.

We recommend that the default destruction efficiency for lean burn gas engines is defined at the practical and actual level of 99.5% or at the very least the theoretical level of 97.01%. **(Harworth)**

RESPONSE: Noted. Please see response to comment #38.

Appendix C Data Substitution and Failed Calibration Guidelines

40. Biothermica welcomes the Reserve's recognition that "unexpected events or occurrences may result in brief data gaps" (pg. 67). The substitution methodology provided for missing concentration and flow readings is, in our opinion, fair and well balanced. The Appendix does not however provide guidance with regard to data gaps occurring for parameters used to adjust flow rate and/or concentration readings, namely pressure and temperature.

If for a given period of time, unadjusted flow rate or concentration is available but pressure and temperature are unavailable, the substitution methodology should be applied to pressure and temperature and the substitute values should be used to adjust the flow rate and/or methane concentration. This procedure is more accurate and conservative than requiring project developers to use a past adjusted flow rate or concentration when actual pressure and temperature are unavailable for brief periods. The underlying reasoning is that methane concentration and flow rate (unadjusted or adjusted) variations have a much greater impact on emission reductions than temperature and pressure variations.

Equation 5 [see Biothermica comment for detailed example] illustrates how flow rate variations have a proportional impact on MMox (and therefore emission reductions), whereas temperature variations on a Fahrenheit scale have a much smaller impact. With regard to pressure, absolute pressure is typically very stable, presenting even less variability than absolute temperature.

The same reasoning can be applied to the concentration parameter if the equipment used requires the measured concentration to be adjusted for temperature and pressure. Concentration variations will have a proportional impact on emission reductions and it is

therefore more accurate to use the monitored unadjusted value for methane concentration, with substitute values for pressure and temperature, than to use a past adjusted value for methane concentration.

It should therefore be allowed to substitute for pressure and temperature simultaneously if they are both unavailable, since the key parameters are the unadjusted flow rate and methane concentration. **(Biothermica)**

RESPONSE: Agreed. We have revised the protocol language to allow for simultaneous substitution for missing temperature and pressure data (which is used to adjust flow rate) using the methodology in Appendix C.