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## **SUMMARY OF COMMENTS & RESPONSES COAL MINE METHANE PROJECT PROTOCOL VERSION 2.0**

6 sets of comments were received during the public comment period for the Climate Action Reserve (Reserve) draft Coal Mine Methane (CMM) Project Protocol Version 2.0 that was released on March 1, 2012. Staff from the Reserve summarize and provide responses to these comments below.

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

Please note that this protocol update process has produced a Version 1.1 instead of a Version 2.0 of the CMM Project Protocol, as there was ultimately no major change to eligibility or project definition that required a Version 2.0.

### **COMMENTS RECEIVED BY:**

1. Biothermica Technologies Inc. (Biothermica)
2. CONSOL Energy Inc. (CONSOL)
3. Green Holdings Corporation (GHC)
4. Stanford Law School, Environmental Law Clinic (Stanford ELC)
5. United States Environmental Protection Agency (U.S. EPA)
6. Verdeo, Sindicatum Sustainable Resources Company (Verdeo)

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### 3.4.1.1 U.S. EPA GHG Permitting Requirements under the Clean Air Act

1. Because best available control technology (BACT) determinations are made by state permitting agencies, the Protocol could undermine effective implementation of CAA requirements by creating political pressure to weaken BACT standards outside of California. Because states have effective control over BACT determination, those with coal mine projects seeking offset credits under this Protocol will face additional political pressure to set BACT at levels that create headroom for offset creation. Strict BACT determinations would reduce or eliminate income from offsets, and thus state regulators could face pressure from offset project owners and developers to keep BACT determinations low. If some states apply strict BACT determinations, while others apply weak determinations, the Protocol could be seen as subsidizing the disparate outcome, as Protocol projects would presumably cluster in states with the most lax permitting agencies.

While these concerns are only hypothetical at this point, we believe the Reserve should have a broader discussion about the unintended consequences its offsets protocols may have in sectors where impending state or federal regulations complicate the application of offset protocol design. We also believe that CAR should develop a plan, set down explicitly in the protocol, to address these concerns once we know more about how states will proceed with BACT determinations for CMM. We would propose that once 5 BACT determinations have been concluded, CAR review them and consider revising Section 3 of the Protocol as appropriate. **[See Stanford ELC public comment submission for more detail and references, comment 1.1.] (Stanford ELC)**

**RESPONSE: We have explicitly stated in the protocol that the Reserve will track developments under the CAA and BACT determinations made at the state level will inform updates to the protocol's additionality tests over time. We will update the protocol appropriately once states begin to establish BACT standards, and will consider at that time whether it is necessary to apply rules to avoid the kinds of perverse incentives contemplated here (e.g., by linking protocol requirements to the most stringent BACT determinations). However, with no BACT determinations yet made for coal mines, we feel it is premature for us to develop a policy regarding these determinations in the current version of the protocol.**

2. Determining what constitutes a "major modification" of an existing coal mine under EPA's Tailoring Rule is an open legal question. The Protocol does not offer any guidance on how project developers would bear the risks associated with litigation on this issue. The Protocol would benefit from a fuller discussion of how these risks would be distributed, especially with the prospect of lengthy litigation or subsequent regulatory developments. We have several questions about what the timing of these kinds of changes would imply for calculating additionality under the Protocol:
  - a) Does the Protocol's legal requirements test apply at the time the legal requirement is identified (i.e., when a court or administrative agency finds that a PSD permit is required) or when the actual legal requirement is specified (i.e., when a state regulator identifies BACT for a particular mine project)?
  - b) If litigation produces a determination that a major modification took place, does the Protocol's

legal requirements test adopt BACT requirements retroactively, from the date of the legal decision, or from the date of the subsequent issuance of a permit? Does it matter whether the question litigated was a new issue that was fairly disputed by both sides?

c) If litigation or a new regulation defines a threshold for major modifications, must all applicable projects immediately adopt BACT requirements as part of the legal requirements test, or are those requirements not binding for the purposes of the Protocol during a legally valid gap (e.g., a temporary window for securing permits)? **[See Stanford ELC public comment submission for more detail and references, comment 1.2.] (Stanford ELC)**

**RESPONSE:**

**a) Per Section 3.4.1, “emission reductions may be reported to the Reserve up until the date that the coal mine methane is legally required to be destroyed.” Assuming BACT requires the destruction of CMM, this means a project can continue to earn CRTs up until the date that the state regulator has required the mine where the project is located to install BACT that destroys CMM.**

**b) Generally, regulations (like BACT requirements) will include an effective date. Once that date is reached, the law is enforceable, barring an injunction from enforcement by the court in which the regulation itself is in question. Even if a court was to enjoin the regulation from taking effect pending the outcome of the litigation, the Reserve would cease to issue CRTs on the original effective date. If a later decision by the court changes the effective date of the regulation, the Reserve would retroactively issue CRTs up until the new effective date of the regulation. This policy is conservative and protects against the perverse incentive of litigation in order to continue to receive CRTs.**

**c) Based on our understanding on how the CAA works, defining a threshold for major modifications does not determine BACT nor does it set a date for when affected mines would need to install BACT. Per the quoted text in response to comment 2a above, a project can continue to earn CRTs up until the date that the state regulator has required the mine where the project is located to install BACT that destroys CMM.**

3. The way the Protocol is currently written, it seems that even the reductions above what is required by law could not lead to carbon credits:

“If [...] a mine triggers the PSD requirements and an official BACT review results in the mandatory installation of a technology that reduces CMM emissions, this activity will not be eligible for carbon offsets”

Possible wording for the Protocol could include :

“If [...] a mine triggers the PSD requirements and an official BACT review results in the mandatory installation of a technology that reduces CMM emissions, this activity will only be eligible to generate offsets beyond what is required by the permit or by law” **(Biothermica)**

**RESPONSE: The current version of the protocol is not designed to credit reductions achieved by going above and beyond reductions that are required by law under this protocol. The performance standard analysis that supports the additionality of projects under this version of the protocol does not account for changes in common practice that**

**we assume would occur if there were regulations that required any level of destruction of CMM.**

**Once BACT requirements have been established, we will then evaluate whether it is feasible to credit reductions that go above and beyond the legal requirements and would incorporate guidelines and criteria for doing so in future updates of the protocol.**

4. Air pollution from coal mines is not yet subject to new source performance standards under Section 111 of the CAA, the future implementation of which would set a floor for state determination of BACT for PSD permits.

EPA has not yet exercised its authority to create performance standards for coal mine methane emissions controls under Section 111 of the CAA, but faces pressure to do so. These performance standards would apply to all new and existing coal mines. State determinations of BACT cannot allow emissions higher than levels determined under Section 111 of the CAA; that is, state BACT determinations are constrained to be no weaker than a performance standard set by EPA under its § 111 authority. Therefore, we believe the Reserve should pay close attention to this issue going forward, as it may either exacerbate or relieve some of the other CAA interactions described in comments 1 and 2 above.

If and when EPA sets a § 111 performance standard, it will act to significantly shift the baseline emissions for all participating or potential projects under the CMM protocol. Furthermore, the Reserve should plan on this performance standard being subject to lengthy litigation. How will project registrations be treated and offsets generated by registered projects during this period of uncertainty be credited? **[See Stanford ELC public comment submission for more detail and references, comment 1.3.] (Stanford ELC)**

**RESPONSE: We will track developments regarding §111 along with the other relevant sections of the CAA. Any changes, including the development of a §111 performance standard on CMM emissions, would be reflected in future versions of the protocol; current projects would have such changes considered as part of the Legal Requirement Test. Regarding timing of enforcement, please see the answer to Comment 2c above.**

### **3.4.2 The Performance Standard Test**

5. The Protocol's Performance Standard Test does not adequately address the possibility that drainage systems have the economically viable option to inject methane into a commercial pipeline, but choose instead to use or flare methane onsite. We are concerned that some offset projects may be able to switch back and forth between earning offsets under this Protocol and selling methane into a pipeline network. If permitted, this would undermine the additionality of the Protocol, and runs counter to principles articulated in other Reserve protocols.

Our concerns arise because the Protocol's eligibility rules allow a drainage system to qualify for offsets by flaring or otherwise using methane, even if selling methane to a pipeline is commercially viable. Under these rules, a drainage system that injects methane into a pipeline would not appear to qualify for offsets if the project developer decides to build a flare or other end-use management application to replace pipeline exports. Assuming the switch happens after three months of injection, it would appear to violate the eligibility rule on timing. However, the eligibility rules allow for multiple drainage systems to exist at a single coal mine, raising the

prospect that as new boreholes are drilled as the mine face advances, the mine operator could elect to either create offsets by flaring or sell pipeline gas from new drainage wells. We would appreciate the Reserve confirming this matter, and suggest further that there is no valid reason to view a project at a mine that has ever injected gas into a pipeline as additional.

Unfortunately, nothing in the protocol rules precludes the reverse ordering: a project that could economically inject methane into a pipeline might choose instead to pursue an onsite activity and earn offset credits. So long as the drainage system does not inject methane into a pipeline network, it is assumed to be additional under the performance standard test.

That assumption is flawed, however, under a variety of plausible economic conditions. Project developers might instead see the Protocol rule structure as giving them the chance to bet long on carbon prices, with a backstop option to sell methane into a pipeline network if carbon prices do not rise as expected. **[See example Figure 1 and economic analysis in Stanford ELC public comment submission, comment 2.]**

This situation is problematic and undermines the actuality of the Protocol. We recommend the Reserve revise the Protocol to prohibit switching from offset credits to pipeline sales, and vice versa. **[See Stanford ELC public comment submission for more detail, comment 2.] (Stanford ELC)**

**RESPONSE: To respond to this comment, it is important to understand that the Reserve allows for multiple projects at a single mine because there are multiple opportunities for CMM recovery at a mine that are, by nature, distinct in many ways (geographically, temporally, quality and quantity of gas recovered, etc.). Mines have the opportunity to recover CMM in four different places at four different times in the mining process: 1. surface pre-mining boreholes (SMM), 2. horizontal pre-mining boreholes (HMM), 3. post-mining boreholes (PMM) or 4. from the ventilation air methane leaving the mine's ventilation system (VAM).**

**We do not agree that a mine that injects CMM in a pipeline should be ineligible for CMM offset projects from all other drainage systems. For example, the vast majority of pipeline projects are SMM projects at extremely gassy mines that do not require cleaning or processing of the SMM before injecting it into pipeline. So while a mine that begins to send SMM to a pipeline (or has sent SMM to pipeline in the past and ceases doing so) would not be eligible for a project that destroys additional SMM, the pipeline project should not affect the ability of that mine to also develop a flare project for its PMM gas, which is of lesser quality and quantity as compared to its SMM gas.**

**We have clarified in Section 5.1.1.1 of the protocol that if a mine has historically sent CMM to a pipeline and ceases to do so, CMM from that drainage system (i.e., SMM, HMM, or PMM) is not eligible to generate CRTs, even if the CMM is sent to an eligible destruction device. To further protect against the switching you describe above, we have also clarified that if a project mine begins to send CMM to a pipeline from the same drainage system where a CMM project is ongoing, CMM from that drainage system will also be deemed ineligible.**

**The possibility that a mine that would otherwise sell methane into a pipeline could instead destroy methane for carbon credits is in theory a valid concern. From an additionality standard-setting perspective, the question is how likely this scenario is to occur. Early in the development of this protocol, the Reserve undertook an analysis of**

the prevalence of CMM pipeline injection at existing mines. We found that while natural gas prices followed a sharp upward trend over the last decade (until 2009), the number of pipeline projects showed little change over this same period. Regression analyses were performed with price as the independent variable and the number of projects as the dependent variable; the analysis showed no significant relationship between price and the number of pipeline projects. Furthermore, based on our research, all of the pipeline projects that are operating today were implemented prior to 2006, and in most cases, prior to 2000. Thus, the projects that we see operational today were developed even prior to the significant increase in natural gas prices that occurred in the late 2000s.

In short, the lack of an observed relationship between gas prices and the number of pipeline projects suggests the economic limits to further market penetration of pipeline sales projects may have already been reached under current economic conditions. To be conservative, we still excluded new pipeline projects from eligibility under the protocol, but currently we do not believe we are likely to see projects come forward where a viable alternative would have been pipeline injection.

Finally, it is important to recognize that making the decision to send CMM to a pipeline is not a quick or easy task. It is a resource- and time-intensive endeavor, with significant lead times for permitting and construction of pipeline and supporting infrastructure, as well as securing permissions with a pipeline company and/or contracts with another gas buyer. Because of this, we do not believe there is great risk in project mines switching back and forth between pipeline sales and offset projects – or viewing pipeline sales as a backstop to a bet on carbon prices – based on the economics involved.

We will continue to track this issue as the carbon market and price signals for offsets mature, and will update eligibility rules and the performance standard as appropriate.

### 3.5 Regulatory Compliance

6. Project developers will not be able to secure financing and invest in projects for which the risk of CRTs not being issued cannot be evaluated and controlled. The scope expansion will be a strong deterrent to project development.

Project developers have control over the activities that are within the project boundaries as defined in the CMM Project Protocol, but they have no control over the activities of the mine. If it is impossible to evaluate and control the risk of CRTs not being issued, it will be very difficult to secure financing for these projects, which depend on CRT generation as their major source of revenue. **(Biothermica, Verdeo)**

**RESPONSE:** Based on the [Environmental and Social Safeguards Policy](#) adopted by the Reserve's Board on September 26, 2012, the Reserve is not expanding the scope of regulatory compliance under the Coal Mine Methane Project Protocol. Rather, we have clarified in the protocol that only non-compliance directly caused by the project or project activities shall be considered when assessing regulatory compliance. This holds true even if the mine owner/operator acts as the project developer.

7. If the scope expansion prevents CMM projects from going forward, the result will be contrary to CAR's mission. CMM projects have the potential of generating annual GHG reductions of

several million tons of CO<sub>2</sub>-equivalent per year. If the scope expansion results in preventing CMM projects from going forward, it will be contrary to CAR's mission of "promoting the reduction of greenhouse gas emissions by pioneering credible market-based policies and solutions." **(Biothermica, GHC, Verdeo)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

8. The scope expansion will not protect the reputation and integrity of the CRTs. By expanding the regulatory scope beyond the project boundaries, CAR is ultimately also expanding the scope of its own responsibilities, oversight and accountability to the mining operations, which are outside the CRT generation process.

The reputation and integrity of the CRTs will be better protected if CAR continues to confine the project boundaries, both from an operational and regulatory standpoint, to greenhouse gas mitigation and not to the mining operations. **(Biothermica, GHC, Verdeo)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

9. Should CAR desire to continue investigating the option of a regulatory scope expansion, we suggest extensive proper research to better understand all regulations applicable to coal mines, in order to provide stakeholders with a common set of data.

Considering the potential implications of such an expansion, if CAR still wishes to progress with this exercise, it is imperative that proper research be conducted on all applicable regulations, similarly to the external research conducted with regard to the data supporting CAR's work on CMM to pipeline activities. Biothermica would be happy to be provide further comments on the result of this research.

The investigation should cover in particular:

- Laws and regulations applicable to coal mines;
- State of compliance of US coal mines with applicable regulations: aggregated data.

**(Biothermica)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

10. CAR should also conduct proper research with regard to its other Protocols, as the regulatory expansion cannot be confined to the CMM Protocol. The feasibility of expanding the regulatory scope in other sectors such as ODS (entire supply chain) and livestock (entire feedlot operation) should, for example, be assessed. **(Biothermica, GHC)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above. As appropriate, the Reserve will update its other protocols over time to reflect the [Environmental and Social Safeguards Policy](#) adopted by the Reserve's Board on September 26, 2012.**

11. In all cases, it should not be left to the discretion of the Verifier to determine whether there was an instance of neglect or intent on the part of the mine. Project developers need clear and objective criteria to be able to secure project financing and invest in these projects.

The establishment of clear and objective criteria is an absolute pre-requisite in order for project developers to invest in these projects. Leaving the determination of negligence or intent on the part of the mine to the discretion of Verifiers creates additional uncertainty and volatility.

It is our opinion that the Verifier should not interfere with the activities already performed by regulatory or supervisory entities such as mine inspectors. Many Verifiers may be unwilling to take on a project Verification with this requirement and mines will also resist the interference of a Verifier with their compliance activities. **(Biothermica)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

12. Mine operators have no obligation, legal or otherwise, to provide the requisite records to verifiers (which are contracted by project developers) to determine whether the occurrences of non-compliance are “recurrent, negligent or intentional” and may withdraw access to such records without notice at any time. Thus compliance with Section 3.5 would not always be verifiable. **(GHC)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

13. To make a determination on what would constitute negligence or intent, verifiers would need a very detailed understanding of the intricacies of mining regulations and enforcement and possibly personal knowledge of the mine’s management. Even verifiers with experience in the mining sector may feel uncomfortable making such a determination and may at a minimum have to bring on external consultants. **(Verdeo)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

14. It is unclear how a verifier would determine mine (or project developer) violations of any and all federal and state regulations. For a mine, regulatory agencies could include MSHA, USEPA, state safety and environmental agencies, etc. Once all violations were found, the verifier would then have to determine the severity of the violation. This does not seem like a reasonable requirement, given that a mine may have hundreds of MSHA violations alone in any given year. **(U.S. EPA)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

15. We strongly recommend against the proposed expansion of regulatory compliance requirements. Our recommendation against these changes is based on the following two observations:

1) Experience to date shows that most or many of potential coal mine methane abatement projects will be undertaken by project developers who are not coal mining entities. These project developers will have the financial and operational responsibilities for the project equipment, but they will have no control whatsoever over the operation of the associated coal mine. It is inherently unfair to penalize these project developers, who may be operating in full compliance with all laws and who may be successfully abating great quantities of methane emissions, for

shortcomings in the operation of the associated coal mine over which they have no control.

2) With respect to occupational safety and health, underground coal mining may well be the single most regulated business activity in the U.S. Some large underground coal mines average almost 3 inspector shifts per day for Federal MSHA inspectors, plus additional inspector hours for State inspectors (from agencies such as the West Virginia Office of Miners Health, Safety and Training, or the Pennsylvania Bureau of Mine Safety). These inspectors' jobs are to seek out any and all violations, whether major or minor. In addition, mines have to comply with numerous regulations of the Clean Water Act, the Clean Air Act, the Surface Mining Control and Reclamation Act, the Resource Conservation and Recovery Act, and others. The result is that there are few, if any, active underground coal mines that are violation-free.

"Project developers are required to disclose in writing to the verifier any and all instances of non-compliance of the project or the mine with any law. If a verifier finds that a project or a project mine is in a state of recurrent non-compliance or non-compliance that is a result of negligence or intent, then CRTs will not be issued..."

Thus, depending on how the above proposed requirement is interpreted, it may be that it is not possible for real-world active U.S. underground coal mines to meet these requirements, and we will be left with a protocol so onerous that it becomes worthless because it is impossible to be met by the associated mine of any methane abatement project. To illustrate this: even though CONSOL Energy's safety performance is much better than the underground coal mining industry average (for example, it was 2.5 times better in 2011), our mines receive numerous MSHA citations each year. **(CONSOL)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

16. In most cases, the project developer will be a third party and will not be the coal mine owner or operator. The project developer will, in turn, contract with the verifier. Therefore, compliance or non-compliance with all applicable laws, rules and regulations by the mine owner or operator will not be within a project developer's control. Accordingly, in our opinion, penalizing the project developer for a non-compliance occurrence by the mine where a project is located is unfair and will be counterproductive to the development of CMM abatement projects. **(GHC)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

17. Mines are already heavily regulated and have strong incentives to achieve compliance. CMM projects are discretionary and will always be secondary to mining operations. Outside of the project boundary, neither the project developer, nor the verifier, nor CAR has the ability to direct the mine's operations. As a result, the scope expansion will not impact the mine's compliance activities, nor result in any incremental improvement in environmental performance.

In fact, there may be unintended, harmful consequences. The EPA and others have noted that projects such as VAM, flaring or other beneficial use projects are likely to "improve mine safety" and "yield substantial environmental benefits"<sup>1</sup>. If the compliance scope expansion results in fewer CMM projects occurring, the net result will be a negative impact on mine industry environmental performance. **(Verdeo)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see**

**response to comment 6 above.**

18. Given the significant number of regulations to which a mine is subject, it is virtually impossible for offset project developers to assess whether a mine is in compliance with all regulations. Coal mining is one of the most extensively regulated industries in the United States. Requiring the investigation of instances of non-compliance with all regulations, outside of the project boundaries, constitutes a significant administrative burden on project developers. **(Biothermica, Verdeo)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

19. We are not aware of any repository maintained with updated records of “all instances of non-compliance” necessary for project developers to provide an Attestation of Regulatory Compliance that would be required under Section 3.5. Accordingly, compliance with 3.5 would not be practicable. **(GHC)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

20. Regulatory compliance by the mine operator is determined by existing mine safety, environmental and other local and state regulations. The coal sector is highly regulated by federal, state and local agencies. The following non-exhaustive list is provided as a guide to some of the federal laws which coal mine operators must comply with:

- Migratory Bird Act (1914)
- Fish and Wildlife Coordination Act (1934)
- Multiple Use - Sustained Use Act (1960)
- Endangered Species Act (1963)
- Wilderness Act (1964)
- National Historic Preservation Act (1966)
- National Environmental Policy Act (1969)
- Bald Eagle Protection Act (1969)
- Mining and Minerals Policy Act (1970)
- Endangered Species Act (1973)
- Forest and Rangeland Resource Planning Act (1974)
- Safe Drinking Water Act (1974)
- Archeological and Historical Preservation Act (1974)
- Noise Control Act (1976)
- National Forests Management Act (1976)
- Resource Conservation and Recovery Act (1976)
- Surface Mining Control and Reclamation Act (1977)
- Clean Water Act (1977)
- Soil and Water Resources Conservation Act (1977)
- American Indian Religious Freedom Act of (1978)
- Clean Air Act (1990)
- Mine Safety and Health Act of 1977 (as amended in 2006)

In its current form, Section 3.5 will require a project developer to be ultimately responsible for the coal mine operators' adherence to each and every regulation that affects the mining industry to protect its investment in the CMM abatement project. In our opinion, Section 3.5 will result in

an unwarranted and excessive financial burden on the project developer. **(GHC)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

21. Instead of expanding the scope of regulatory compliance, the Reserve could consider using tools at its disposal to protect the integrity of its projects in the unfortunate situation where an incident of non-compliance occurred at a mine where a Reserve project was operating. Specifically, the Reserve could, at its discretion, choose to suspend or delist projects that are located at mines which experience such an incident. **(Verdeo)**

**RESPONSE: The scope of regulatory compliance is not being expanded - please see response to comment 6 above.**

## 5 Quantifying GHG Emission Reductions

22. The definition of coal mine gas (CMG) is given on pg. 23, but the term is used a number of times earlier in the protocol. **(U.S. EPA)**

**RESPONSE: For clarity, we have added an explanation and definition of CMG early in the protocol (Section 2.3).**

### 5.1.1 Calculating Baseline Carbon Dioxide Emissions from Methane Destruction

23. The data unit applied to the NMHC requirement should include the notion of standard conditions.

The NMHC requirement is currently expressed in mg/m<sup>3</sup> on a wet basis (pg. 27, 33). This requirement should refer to standard conditions and therefore be expressed in mg per standard cubic meters. Alternatively, the expression “wet basis” could be replaced by “wet volume of air in standard conditions.” **(Biothermica)**

**RESPONSE: The protocol language has been revised to specify measurements “on a wet basis at standard conditions.”**

24. The “r” coefficient represents a relative mass proportion of NMHC compared to methane.

We recommend that the following minor adjustment be applied with regard to the description of the “r” coefficient (p 27 &34), suggested in redline as applied to the existing text:

r = Relative mass proportion of NMHC compared to methane **(Biothermica)**

**RESPONSE: The protocol has been revised accordingly.**

## 6.1 Monitoring Requirements

25. We approve of the changes to the monitoring requirements that have been presented and appreciate that the Reserve has demonstrated a willingness to work with project developers and other stakeholders to identify valuable improvements.

We believe that many of these changes should also be released in an Errata and Clarifications announcement applicable to projects listed under Version 1.0; they would be very useful to project developers and would keep verification costs down while improving project integrity. Specifically, we would like to see the following in an Errata and Clarifications announcement:

- Changing NMHC threshold requirement from a volume requirement to a mass requirement (35,000 mg/m<sup>3</sup>);
- Expand eligibility of labs for NMHC testing to include non-ISO 17025 certified labs;
- Guidance to allow for a single meter to monitor multiple destruction devices; and
- Updated QA/QC requirements, including the removal of requirements for quarterly inspections and for equipment calibration every 5 years. **(Verdeo)**

**RESPONSE: These changes are not suitable for inclusion as errata and clarifications to Version 1.0 as they are neither errors nor clarifications of existing guidance; these are new protocol requirements that replace existing requirements. Project developers are welcome to move projects currently registered under Version 1.0 to Version 1.1 during their next verification.**

26. We note that the CAR Mexico Landfill Protocol V1.1 uses the international system of units instead of the U.S imperial system used by the CMM Protocol. In a spirit of Protocol harmonization and providing flexibility to the project developers, we recommend that CAR allow project developers to measure and report temperatures, pressures and flow rates in the data units of their preference, as long as the calculations are consistent with the end result being expressed in metric tons of CO<sub>2</sub> equivalent.

For example, it should be allowed to measure and report:

- Temperature in °C, °F, °R, or °K
- Pressure in atm, inches of water or Pa
- Flow rates in cfm or m<sup>3</sup>/h

**(Biothermica)**

**RESPONSE: As this is a protocol for projects in the U.S. only, we are maintaining the current units. Project developers may measure in units other than what is specified in the protocol, as long as project quantification is completed in the designated units.**

27. For VAM projects: The reaction chamber is a component of the oxidation system, where the flow is very variable. The flow entering the reaction chamber is not the correct flow to be used to determine the mass of methane entering the oxidation unit. We therefore recommend the following wording with regard to the monitoring requirements for VAM projects, also proposing some simple harmonization in the presentations of the requirements (pg. 38):

“For VAM projects, monitoring requirements include:

- The total inlet flow entering the ~~reaction chamber~~ *oxidation unit*, measured continuously and

recorded every two minutes;

- *If required in order to standardize the flow rate, the temperature and pressure of the inlet flow entering the reaction chamber in the vicinity of the flow meter*, measured continuously and recorded at least every hour to calculate hourly pressure and temperature;
- The fraction of methane in the ventilation air entering the oxidation unit and in the exhaust gas, measured continuously and recorded every two minutes to calculate average methane concentration per hour;
- *If required in order to correct the concentration readings, the temperature and pressure in the vicinity of the methane analyzers*, measured continuously and recorded at least every hour to calculate hourly pressure and temperature. **(Biothermica)**

**RESPONSE:** The protocol has been revised accordingly.

## 6.2 Instrument QA/QC

28. As CAR has clarified that the +/- 5% accuracy requirement with regard to field checks applies to the reading, the protocol should take into account situations where the reading is equal to or close to zero. A +/- 5% accuracy requirement on the reading is inapplicable when the values are equal or close to zero, such as 0°F for example. The Protocol should offer a complementary accuracy requirement. It should also be noted that this procedure, namely providing both a percentage and an absolute value, is common practice on the part of the manufacturers with regard to the accuracy of the monitoring equipment. **(Biothermica)**

**RESPONSE:** We will consider this comment at a programmatic level as this guidance is standard across all of the Reserve's methane protocols. Project developers should contact the Reserve if this situation arises during project implementation or verification for additional guidance. For example, this issue could be solved for equipment that measures temperature by converting readings to a different unit of measurement (e.g., °C or K).

29. We propose that the second paragraph on page 40 read as follows, for clarity purposes:

"For the interval between (1) the last successful field check *or calibration event* and (2) *any field check or calibration event* confirming accuracy outside the  $\pm 5\%$  threshold, all data from that meter or analyzer must be scaled..." **(Biothermica)**

**RESPONSE:** The protocol has been revised accordingly.

30. Under-reporting of the methane concentration at the outlet would for example lead to an overestimation of emission reductions. However, as the Protocol is currently written, no adjustment would be required. We therefore recommend the following wording for the two bullet points on page 40:

1. For *field checks or* calibrations that indicate ~~under-reporting (lower flow rates, or lower methane concentration)~~, *an underestimation of emission reductions*, the metered values must be used without correction.

2. For *field checks or* calibrations that indicate ~~over-reporting (higher flow rates, or higher methane concentration)~~ *an overestimation of emission reductions*, the metered values must be

adjusted based on the greatest calibration drift recorded at the time of calibration.”  
**(Biothermica)**

**RESPONSE: The protocol has been revised accordingly.**

31. The third paragraph on page 40 refers to “... the penalties above”. However, the calibrations or adjustments in items 1 and 2 “above” this reference are not labeled as penalties. **(U.S. EPA)**

**RESPONSE: The protocol has been revised to reference the “adjustments above” instead of penalties.**

## **Appendix C Data Substitution Guidelines**

32. If temperature is missing but pressure is available, project developers should be allowed to use the real pressure values instead of being required to substitute also for pressure. The Protocol currently requires that “the methodology be applied to both parameters simultaneously, regardless of if data is available for one or the other.” We do not understand the rationale for requiring projects to substitute for real data that has been actually measured. **(Biothermica)**

**RESPONSE: It is conservative to substitute for both pressure and temperature. For example, the loss of temperature values could be the result of a weather anomaly which could also affect pressure values. Therefore, it may not always be conservative to use real pressure or temperature values when the other is missing.**

33. The table in Appendix C currently specifies that the hours of normal operations should be used if the duration of the missing data is less than six hours. This should also be the case for the other time durations: “six to 24 hours” and “one to seven days.” The text in the second and third table rows should read, “24 hours *of normal operations* prior to and after the outage” and “72 hours *of normal operations* prior to and after the outage.” **(Biothermica)**

**RESPONSE: The protocol has been revised accordingly.**