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Dear Richard, Edie, Virgil, Steve, Rajinder and Greg,

Thank you for your time listening to the concerns that our group presented about the draft Mine Methane Capture Offset Protocol in person last week. We greatly appreciate the attention and consideration you put to the issues that we raised.

At the meeting each of you asked probing questions which we would like to take the time to respond to more fully than we did in person. Below we list some of the questions you asked last week, followed by considered answers which we hope may further clarify the reasons for our concerns and recommendations. These answers are described in more detail in the formal comments we are submitting on the draft Protocol, but we thought it might be helpful to provide some direct answers to the questions you raised.

On improving mining profits:

? The Board assumes that profit margins from MMC projects are 15%, but Stanford's analysis ignores the costs of MMC projects.

We wish to emphasize that our goal has been to "scope" this problem to determine whether further analysis is merited. Our original comments to the Board from July 1, 2013 estimated the potential effect on mining profits from offsets credits generated by twenty potential MMC projects at ten gassy active underground mines that the EPA has identified as having drainage wells, but where mine operators were venting (i.e., not destroying) either all or nearly all mine methane emissions in 2006.[1]

Based on your input, in the last few days we refined this analysis to include the costs of MMC projects. We estimated MMC implementation costs using the U.S. Environmental Protection Agency's (EPA's) Coal Mine Methane Project Cash Flow Model.[2] We ran the model for each sample project using mine-specific methane flows and VAM concentrations as reported by the EPA,[3] and mid-point values for each project cost parameter based on the range of possible inputs provided by the Model. This exercise was meant to examine whether offsets profits could be large enough to change mine owner decisions about mine operations, and whether further refined analysis is merited, even when including the cost of implementing MMC projects.

The Cash Flow Model predicts that eight mines with drainage methane flows greater than one million cubic feet per day are viable candidates for offsets flaring projects. These eight MMC offsets projects are projected to generate profit margins between 40% and 92%, with an average profit margin of 70%.

The Cash Flow Model predicts that the mines with ventilation air methane (VAM) concentrations of 0.8% or greater are viable candidates for VAM oxidation offsets projects. Profit margins for these projects range from 40% to 53%, with an average profit margin of 46%.

? What about monitoring and verification costs?

In an informal conversation with a voluntary offsets verifier and consultant, the verifier estimated, based on experience with other project types, that each verification would cost $10,000 to $20,000 and that monitoring and reporting costs would be less than verification costs each year. In the revised analysis, we assume monitoring, reporting and verification costs are $60,000 for each project. To put this in context, annual profits from offsets sales of most offsets project analyzed are more than one million dollars.

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[1] EPA. 2009. Identifying Opportunities for Methane Recovery at U.S. Coal Mines: Profiles of Selected Gassy Underground Coal Mines 2002-2006. EPA 430-K-04-003

[2] http://www.epa.gov/methane/cmop/resources/cashflow_model.html accessed 20 October 2013

[3] EPA. 2009. Identifying Opportunities for Methane Recovery at U.S. Coal Mines: Profiles of Selected Gassy Underground Coal Mines 2002-2006. EPA 430-K-04-003, and EPA. 2010. U.S. Underground Coal Mine Ventilation Air Methane Exhaust Characterization

? What are your conclusions from the refined profits analysis?

Taking into account MMC implementation costs, and the costs of monitoring and verification, and assuming a $10 offset price, we find that flaring projects can increase mining profits by an average of 12% for the eight modeled flaring projects, with a range of a 2% to a 59% increase in profits among the eight mines. We find that VAM projects can increase mining profits by an average of 5% for the four modeled VAM projects, with a range of a 4% to a 7% increase in profits among the four mines. The influence of the offsets program on mine profits would be higher if mine profit margins or MMC implementation costs are less than average, or if the offset price exceeds $10. We continue to believe that the potential profit margins of these magnitudes for some MMC offsets projects are large enough to suggest that the Board should perform a more detailed analysis to better understand the effects of these profits on the production and use of coal prior to protocol adoption.

? The Board doesn't expect MMC projects to be implemented that capture methane from drainage systems at active underground coal mines, so does not include flaring projects in its profits analysis.

The EPA report which Greg cited at the meeting last Wednesday (U.S. EPA (2013) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011. http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2013-Main-Text.pdf)
states:

> "23 U.S. coal mines supplemented ventilation systems with degasification systems. Degasification systems are wells drilled from the surface or boreholes drilled inside the mine that remove large volumes of CH4 before, during, or after mining. In 2011, 14 coal mines collected CH4 from degasification systems and utilized this gas, thus reducing emissions to the atmosphere; all of these mines sold CH4 to the natural gas pipeline, including one that also used CH4 to fuel a thermal coal dryer. In addition, one of the mines destroyed a portion of its ventilation air methane using a thermal oxidizer"

Thus, 14 of 23 mines inject drainage methane into a pipeline, a project type not eligible under the current draft Protocol. However, we understand that the *other* 9 projects that have drainage wells and vent methane rather than injecting it into a pipeline are prime candidates for MMC projects such as flaring projects. If the Board assumes that the Protocol would not credit these projects, we are interested in learning the reasons for this belief, and wonder then, why the Board includes active underground mines in the Protocol.

On the non-additionality of credits from abandoned mines:

? Why is there such concern about the level of additionality of the abandoned mine portion of the Protocol when only a handful of abandoned mine MMC projects were implemented since 2000 without the help of carbon credits?

We understand that, since 2000, mine methane capture projects have been installed at seven abandoned mines which were not registered under a voluntary offsets program. Informally, one industry expert estimated that they expect the MMC protocol, at current offsets prices, to enable on the order of five to ten additional projects to be implemented. While a past rate of business-as-usual project development is only an approximate predictor of near-term future development, and the estimate of five to ten new additional projects is one individual's informed estimate, these numbers provide one possible, and not unlikely, scenario for the outcomes of the Protocol on abandoned mines.

This scenario points to around half of the abandoned mines participating in the Protocol being non-additional. If the business-as-usual projects capture more methane than the additional projects (likely because larger projects are more cost effective and more likely to more forward on their own), then the proportion of non-additional credits would be greater than half of all credits generated under the Protocol by abandoned mines.

Excluding projects that captured methane when active would improve the balance of additional to non-additional credits; three of the business-as-usual projects that were built since 2000 injected methane into a pipeline when they were active. But excluding these projects would still allow four non-additional projects at abandoned mines to participate in the Protocol, which is still substantial compared with five to ten truly additional projects expected to participate by one industry expert.

? One recommendation raised at the meeting was to exclude abandoned mines that captured methane without the help of carbon credits when they were active. But doesn't allowing these mines to be eligible create a financial incentive for mines to close, become abandoned, and generate credits?

We make the recommendation to exclude these mines from crediting on the basis that it is common practice for mines that captured methane when active to also capture methane upon abandonment.[4] Certainly, one potential downside to this exclusion is that allowing all mines to generate offsets when abandoned would create an additional financial incentive for mines to close. However, we understand that the Board must be primarily concerned with ensuring that the Protocol meets the requirements of AB 32 that credits should be real and additional. The Board should only consider risking the generation of non-additional credits if the potential for the Protocol to incent mine closures is so large that the emissions savings from the effects of the Protocol from mine closures clearly outweighs the expected non-additional crediting that would result from including these mines.

[4] Communication with industry expert.

Finally, if the Board is assuming that the financial incentive created by offsets may induce some mines to close because they are at the margin, this this assumption also supports the need for a fuller assessment of whether the incentive of offsets credits at mines that are currently active will be sufficient to induce these mines to remain open.

? Claims that the abandoned mine portion of the Protocol could generate a majority of credits from non-additional projects is irrelevant under the Board's definition of additionality.

Last Wednesday we learned that the Board defines a project type as additional if that project type is not common practice, where common practice is assessed as a proportion of facilities currently implementing the technology to the number of facilities that could possibly implement the technology.

AB 32 describes additionality thus:

> 38562(d)(2) For regulations pursuant to Part 5 (commencing with Section 38570), the reduction is in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur.

We believe that the Board's adopted process of assessing additionality with a common practice analysis for a population of facilities does not reflect the spirit and intention of AB 32. The fundamental idea of an offsets program is to "offset" real reductions under the cap with real reductions outside of the cap. If the abandoned mine portion of the MMC protocol generates a large proportion of its credits from projects that would have been implemented regardless of the offsets income, the Protocol does not fulfill the spirit and intention of AB 32, nor the statutory requirement it establishes.

We describe procedures by which the Board could practically assess additionality in a way that does meet the intention and requirement of AB 32 and does not require project-by-project assessments. We believe these procedures are feasible within the capacity of the Board. What is required is to use a performance standard that is simply somewhat more involved and analytical than the assessment of common practice on the basis of an ill-defined population of facilities.

An additionality assessment should involve (1) conservative estimates of the business-as-usual projects that could be credited by a protocol, based on past trends, and (2) conservative estimates of the expected effect of the protocol on new project development. (3) A project type should be considered additional if the expected effect of the protocol on emissions reductions far exceeds the expected non-additional crediting that could occur under the protocol, and if the conservativeness of the protocol's methods of estimating emissions reduced by participating projects counter-balances the anticipated non-additional crediting. Please note that this does not mean that there can be no credits generated by non-additional projects, but simply that the total number of credits generated by the Protocol should not exceed the effect of the Protocol on emissions reductions.

We encourage the Board to do this analysis on the abandoned mine portion of the MMC protocol, and to exclude subsets of abandoned mines from participation in the protocol to avoid over-crediting.

On conflicting incentives:

? We also discussed the recommendation to exclude all new active underground mines and all active underground mines that have undergone major modification from participation in the Protocol. This recommendation was made to avoid conflicts with the Clean Air Act and to avoid incentivizing flaring at mines that would have pipeline injected without the offsets protocol. But wouldn't these projects, incented by offsets, help establish the case that MMC should be considered BACT (Best Available Control Technologies)? And aren't we just speculating about future EPA regulation that will take years to happen?

First, we should be clear that new and expanding mines are currently required, under EPA's New Source Review permitting procedures and Tailoring Rule, to obtain Prevention of Significant Deterioration (PSD) permits. We agree with the Board that no mines have yet to seek these permits nor would the permits on their face constitute a legal requirement to destroy methane emissions. Such a legal requirement would only occur if a state implementing the PSD permit made a determination that methane destruction was the Best Available Control Technology (BACT).

Due to the relatively slow rate at which new mines are built and expanded, it is expected that the majority of credits generated under the active underground mine portion of the Protocol will be from existing mines rather than new mines or new mine extensions. By incenting the development of MMC projects at existing mines, the Protocol helps generate experience with MMC technologies that will encourage MMC to be considered BACT. We agree with the Board that this positive influence of the Protocol on policy implementation is a form of positive leakage – emissions reductions supported by the Protocol but not credited under the Protocol. However, because of the relatively small proportion of new and expanding mines expected to participate in the Protocol, excluding these mines, we understand, should not substantially weaken this positive leakage effect.

? Are new underground mines actually opening and expanding?

New mining at Alabama's Blue Creek seam, one of the country's most gassy coal seams, is being planned. If built, this project would require a PSD permit and would have incentives to flare methane instead of injecting it into the pipeline because flaring should generate more income than pipeline injection, even though other mines in the immediate vicinity are already injecting methane into a pipeline.
http://walterenergy.com/operationscenter/jwr.html

Though Patriot Coal is generally slowing down its operations and closing mines, it did open one new underground coal mine – Peerless mine – In West Virginia in 2012.
http://www.patriotcoal.com/index.php?view=appalachia-operations&p=3&s=51

Please do not hesitate to be in contact if you have any questions or thoughts on anything discussed above.

Most sincerely,

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