May 8, 2024

VIA ELECTRONIC SUBMISSION

California Air Resources Board

Re: Comments to Compliance Offset Protocol on Mine Methane Capture Projects

Iron Senergy (Iron) was pleased to join the California Air Resources Board (CARB) Public Workshop on Potential Amendments to the Cap-and-Trade Regulation. Pursuant to CARB's request for comment, Iron offers the following commentary with regard to the Compliance Offset Protocol on Mine Methane Capture Projects.

INTRODUCTION

As background, Iron is a veteran-owned company based in Waynesburg, Pennsylvania that manages critical assets in the southwest corner of the Commonwealth, including an active underground coal mine (the Cumberland Mine), a closed underground coal mine (the Emerald Mine), approximately 15,000 acres of owned surface land, a coal preparation facility, a private rail line, two transloading terminals and related mining equipment and surface infrastructure.

While the Cumberland and Emerald mine properties have been in operation for several decades under numerous ownership groups, they are now serving as the foundation for a new platform - one focused on operating as a responsible energy company and serving as a blueprint for strategic reclamation and synergistic diversification within the U.S. thermal coal industry. This platform provides Iron with a unique perspective on how the current compliance and voluntary carbon offset protocols could be updated to increase adoption across the mining industry and ultimately lower GHG emissions in hard to abate sectors through co-benefit strategies.

PIPELINE INJECTION

Section 3.4.2 "Performance Standard Evaluation", part 2.(b) of the current MMC protocol states as follows:

> Pipeline injection of mine methane extracted from methane drainage systems at active underground mines is common practice and considered business-as-usual, and therefore ineligible for crediting under this protocol.

While more common at the time of MMC protocol issuance, instances of mines upgrading and injecting mine methane (MM) into interstate pipelines have diminished significantly due to the high costs associated with the practice and the emergence of hydraulic fracturing procedures (fracking) in the exploration & production industry, which has led to substantially higher volumes of cheap natural gas, making an investment in upgrading, transporting and injecting MM uneconomical by comparison. As presented in the 2024 Global Methane Forum, US MM pipeline injection projects have decreased 87% from 2010 to 2023. As of 2022, public data available from

the EIA, MSHA and offset registries show capture projects (beneficial use and destruction) at only 2.4% and 0.1% of all active and abandoned U.S. coal mines, respectively. These numbers suggest that MM collection is not *common practice* in the industry and that there is room to increase utilization.

The inclusion of pipeline injection as a qualified destruction device will encourage investment and the adoption of additional MM capture projects, as well as the development of beneficial use cases. This has been demonstrated with Version 1.1 of the ACR MMC protocol, "*Capturing and Destroying Methane From U.S. Coal and Trona Mines",* where pipeline injection has been added as a qualifying destruction device. It is reasonable to assume that this modification and others will increase the amount of fugitive GHG collected in the mining industry while creating a co-benefit of utilizing the heat value of a waste stream.

BOOK-AND-CLAIM MODEL

Due to unfavorable locations, topography and associated infrastructure at a typical mine degasification project, many beneficial use cases are not feasible under the current MMC protocol, which does not allow for the use of the book-and-claim methodology. As seen with the LCFS, use of book-and-claim with CH_4 molecules will permit the industry to harvest low carbon intensity fuel from stranded assets and deliver the same as feedstock at a more commercially strategic location where it can be used for ancillary projects, including for power generation and use, feedstock for conversion to alternative fuels, thermal use, feedstock for materials manufacturing, and other uses that support a low carbon economy.

In figure 4.2 of the MMC protocol *Illustration of the offset project boundary for active underground mine methane drainage activities,* SSR 3 allows for transportation of mine gas to one of the qualifying destruction devices allowed under the protocol. By modifying SSR 3 to include pipeline transfer offsite via a similar book-and-claim method as demonstrated through the LCFS, it is reasonable to conclude that more collection projects will use MM as a feedstock for beneficial use. Book-and-claim accounting methods are a standard practice in the natural gas industry and can be utilized via a revised MMC protocol both nationally and regionally to support investment and advanced manufacturing, including in communities defined as Justice 40 and IRA Energy Communities.

In addition to transportation under SSR 3, expansion of beneficial use options should include "manufacturing feedstock" as a destruction mechanism to allow for use in low carbon materials that can replace high carbon intensity (CI) materials.

PRE-MINE DRAINAGE AND DEFINITIONS CLARIFICATION

Section 5.2.1. "Quantifying Baseline Emissions", part (r) of the current MMC protocol states as follows:

> Emissions from the release of methane through a pre-mining surface well is only accounted for in the baseline during the reporting period in which the emissions would have occurred (i.e., when the well is mined through).

This section has been the subject of multiple interpretations and needs to be clarified to provide that emissions are captured, destructed and available for the credit issuance process at the time of degasification rather than at the time of future mining.

The process of drilling surface wells and liberating gas prior to mineral extraction is expensive and used to develop a mine for future mining activities. Similar to other facets of mine design, including mineral reserve quantification, infrastructure development, rock mechanic design, ventilation device installation, and room-and-pillar entry development, pre-mine degasification is a mine development activity that must be conducted well in advance of mining activities to allow for the safe extraction of the ore body. As such, the vented mine gas and associated GHG emissions occur at the time of drilling as part of that development activity.

Section 5.2.1.r can be improved by better distinguishing between the definitions of Coal Bed Methane (CBM) and Mine Methane (MM) within the protocol, wherein:

- MM is currently defined as "methane contained in mineral deposits and surrounding strata that is released as a result of mining operations; the methane portion of mine gas"; and

- CBM is currently defined as "methane-rich natural gas drained from coal seams and surrounding strata not disturbed by mining. The extraction, capture, and destruction of virgin coal bed methane are unrelated to mining activities".

Importantly, "mining activities" is further defined as "working an area or panel of coal or trona that has been developed and equipped to facilitate mineral extraction and is shown on a mining plan". Updating this definition of "mining activities" to include "development activities" will (i) clarify that the definition of MM includes all methane within a natural mine boundary, (ii) lead to the increased capture of pre-mine drainage gas and serve as one of the most effective ways to lower GHG emissions (as methane extracted through surface and in-seam horizontal wells typically contains the highest CH_4 % of mine gas and is the most effective for beneficial use cases), and (iii) better distinguish CMM from CBM that is outside a natural mine boundary (and thus unrelated to mining activities). Natural mine boundaries can be established by third party designation that the reserves therein are proven, probable and feasible to mine.[1]

The clarifications around pre-mine methane drainage projects will better distinguish true mine methane from virgin coal bed methane that is not associated with a mining plan and result in higher utilization of pre-mine drainage projects. These projects present the best opportunity to capture MM at high concentrations (~90% CH_4) and prevent high volume / low concentration VAM emissions that can be difficult to eliminate.

[1] Third party technical reports for a mine's resources and reserves are standard practice within the industry and adequately portray the extent to which a development activity reasonably could occur.

REMOVE BARRIER FOR ENHANCED CMM RECOVERY

Section 2.2 "Active Underground Mine Methane Drainage Activities", part h.(2) of the current MMC protocol prohibits the "Use CO_2, steam, or any other fluid/gas to enhance mine methane drainage." In the past two decades, research on CO_2 storage in coal seams and simultaneously enhanced coal mine methane recovery (ECMM) has attracted a substantial amount of attention due to its win-win effect between greenhouse gas (CO_2) emission reduction and coal mine methane recovery enhancement. CO_2 is commonly used for advanced recovery in oil and gas wells and has shown the ability to increase CMM recovery ratios in coal seams from 50% to as high as 95%. Increasing drainage ratios will directly correlate with a decreased amount of MM that comes in the form of VAM during the mining process. If this is adopted, an additional SSR will need to be included in the protocol to account for CO_2 used in the project as it will later be vented during the mining process. Steam and other fluid/gas used may or may not need to be accounted for depending on GHG designation.

This modification has the dual benefit of decreasing MM that will otherwise be vented to the atmosphere while also providing valuable research on the effectiveness of geological sequestration of CO_2 in coal seams.

CONCLUSION

The above comments are not made in isolation but considered through several years of discussions with stakeholders on every level of the value chain. This includes carbon offset registries, offset project operators, verification and validation bodies, consultants, investors, government bodies, and individual mines, all of which are striving to lower GHG emissions.

Thank you in advance for your consideration of these comments.

Sincerely Yours,

Jon Brown

Jon Brown
Vice President, Business Development