California Air Resources Board
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ARB Compliance Offset Program

Mine Methane Capture Projects Compliance Offset Protocol

Frequently Asked Questions

Under California's Greenhouse Gas (GHG) Cap-and-Trade Program, covered entities may use ARB offset credits to fulfill up to 8% of their compliance obligation. Offset credits are tradable compliance instruments that represent verified GHG emission reductions or removal enhancements made in sectors and sources not covered by the Cap-and-Trade Program.

ARB has developed this Frequently Asked Questions (FAQ) document specific to mine methane capture projects using ARB's Compliance Offset Protocol for Mine Methane Capture Projects (MMC Protocol). These FAQs clarify existing requirements in the MMC Protocol.

1. Eligibility

a) The definitions section of the protocol requires that, in order to be eligible, active surface mines and active underground mines must be classified by the Mine Safety and Health Administration (MSHA) as active, intermittent, or temporarily idle, and abandoned underground mines must be classified as abandoned or abandoned and sealed. The protocol does not include new or non-producing mines as eligible mine classifications. Can a project occur at a mine classified as new or non-producing? Can a project be listed or commence at a mine classified as non-producing expecting that it will soon be reclassified as abandoned?

No, a mine that is classified as new or non-producing is not eligible for an MMC project. An offset project can only commence and be listed if the MSHA classification meets the requirements of the definitions section of the MMC Protocol.

b) "Active Underground Mine," "Active Surface Mine," and "Abandoned Underground Mine" are defined in section 1.2 of the MMC Protocol. Those definitions rely upon MSHA classifications. If a mine's status is incorrectly classified by MSHA, can a project be listed or commence at that mine?

No, the project cannot be listed until the mine's classification is corrected by MSHA to accurately reflect its status to one which is eligible under the MMC Protocol. The Offset Project Operator (OPO), Authorized Project Designee (APD), or the mine operator (if not the OPO or APD) must work with MSHA to correct the mine's status prior to listing or commencing the project.

c) If a non-qualifying destruction device is connected to a well, borehole, or ventilation shaft during the year prior to offset project commencement, does that make the mine gas or ventilation air from that specific well, borehole, or ventilation shaft ineligible? What about other boreholes, wells, and ventilation shafts at the mine?

Mine gas or ventilation air from any individual well, borehole, or ventilation shaft connected to a non-qualifying destruction device at any point during the year prior to the offset project commencement is not eligible for crediting. However, other mine gas or ventilation air from the *methane source*, defined as the methane source type (e.g., wells, boreholes, or ventilation shafts in the aggregate), remains eligible for crediting. The MMC Protocol identifies what constitutes an eligible methane source for each project type (see MMC Protocol subchapters 2.1(a), 2.2(a), 2.3(a), and 2.4(a) for more detail). Even if a non-qualifying destruction device is connected to certain boreholes, wells, or ventilation shafts, mine gas or ventilation air from other boreholes, wells, and ventilation shafts at the mine may remain eligible.

d) The MMC Protocol defines offset project commencement as the date at which the offset project's mine methane capture and destruction equipment becomes operational. Can a destruction device for which the project is *not* claiming credits trigger offset project commencement by becoming operational?

No, offset project commencement is only triggered when a qualifying destruction device for which the project is claiming credits becomes operational as defined by section 3.6(a) of the MMC Protocol. A non-qualifying destruction device cannot trigger offset project commencement.

2. Project Configurations

a) Can ventilation air or mine gas from a single well, borehole, or ventilation shaft be sent to two or more distinct qualifying destruction devices and be considered separate projects?

This depends in part on whether there is more than one OPO (which is the mine operator or entity that owns or leases the equipment used to capture or destroy mine methane).

If there is a single OPO and the qualifying destruction devices become operational on the same day, the OPO has the option of operating the qualifying destruction devices under a single project or establishing separate projects. If there is a single OPO and a qualifying destruction device is added to a well, borehole, or ventilation shaft already connected to an existing qualifying destruction device, this addition of the new qualifying

destruction device is considered an offset project expansion (i.e., an addition to an existing project). In that situation, the qualifying destruction devices would operate under one project.

If there are distinct OPOs for each qualigying destruction device (either the qualifying destruction devices are owned or leased by separate entities or the mine operator is the OPO for one qualifying destruction device and the owner or lessee of the destruction device is the OPO for the other qualifying destruction device), each qualifying destruction device is considered to be a separate project with different OPOs regardless of when the qualifying destruction devices became operational.

Even if multiple qualifying destruction devices are split into separate projects, each project must account for the entire quantity of mine methane destroyed by non-qualifying destruction devices operating at the mine in the baseline and project scenarios. If one qualifying destruction device becomes operational prior to the other, the first destruction device would be considered a non-qualifying destruction device in the second project, thereby making the methane from that shared well, borehole, or ventilation shaft ineligible for the second project. Each project must also account for the project emissions from energy consumed to power additional equipment required to capture and destroy mine methane. If the energy consumed by each project cannot be distinguished, then each project would report the total energy consumed by the projects. Each project must meet all requirements of the MMC Protocol and Cap-and-Trade Regulation, and must undergo separate verifications.

b) Can multiple mines utilize the same qualifying destruction device? If so, would this be considered one project or separate projects?

Yes, multiple mines capturing mine gas or ventilation air from different wells, boreholes, or ventilation shafts may utilize the same qualifying destruction device (or set of qualifying destruction devices). This is inclusive of all mine types eligible under the MMC Protocol but can only be done as separate offset projects with the mine gas or ventilation air sent from each mine being monitored separately. Under this scenario, each project must account for the project emissions from energy consumed to power additional equipment required to capture and destroy mine methane. If the energy consumed by each project cannot be distinguished, then each project would report the total energy consumed by the projects. Each project must meet all requirements of the MMC Protocol and Cap-and-Trade Regulation, and must undergo separate verifications.

If a qualifying destruction device is moved from one mine to another, the temporary absence of a qualifying destruction device from a project site does not impact the length of the reporting period nor eliminate the need to continue to monitor and report methane

sent to non-qualifying destruction devices during the whole of the reporting period. Additionally, if the equipment is field checked around the time the qualifying destruction device is removed from a mine, that check can serve to meet the QA/QC requirement of subchapter 6.2(a)(2) of the MMC Protocol. A subsequent check occurring no more than two months before and one day after the end of the reporting period is not necessary unless the qualifying destruction device is reactivated at the mine during the reporting period.

c) One of the early action protocols (Climate Action Reserve's Coal Mine Methane Project Protocol), allows for equipment installed for the safety of the mine to be excluded from the project accounting, deeming it outside the GHG accounting boundary. There is no such provision in the MMC Protocol. Is safety equipment powered by mine methane similarly considered "outside" the GHG accounting boundary of the MMC Protocol?

No, safety equipment powered by mine methane (e.g., a heating or ventilation system) is not considered "outside" the project's GHG accounting boundary or exempt from the requirements of the MMC Protocol. Safety equipment powered by mine methane is treated like any other destruction device. If a destruction device, including safety equipment, was operational prior to project commencement, it is a non-qualifying destruction device for the purposes of the MMC Protocol and must be monitored accordingly.

3. Quantification

a) The MMC Protocol states that ventilation air or mine gas sent to non-qualifying destruction devices must be monitored and accounted for in both the baseline and project scenarios. Must non-qualifying destruction devices be accounted for even if projects are implemented on other wells, boreholes, or ventilation shafts at the mine?

Yes, regardless of which methane sources or specific wells, boreholes, or ventilation shafts the project's qualifying destruction devices are connected to, the volume and methane concentration of ventilation air or mine gas sent to all qualifying and non-qualifying destruction devices must be monitored and accounted for in the baseline and project scenarios used to calculate emissions reductions each reporting period. Specifics on how baseline values for ventilation air or mine gas that would have been sent to non-qualifying destruction devices are determined are found in subchapters 5.1.1(f)-(o), 5.2.1(g)-(n), 5.3.1(g)-(m), or 5.4.1(h)-(n) depending on the project type.

b) To determine the baseline values for ventilation air or mine gas that would have been sent to non-qualifying devices for destruction during the

reporting period, the MMC Protocol requires the OPO or APD to calculate and compare the volume or mass of ventilation air or mine gas sent to the non-qualifying destruction devices in the past with the volume or mass of ventilation air or mine gas sent to the non-qualifying destruction devices during the reporting period. How can a mine with non-qualifying destruction devices that were not historically metered comply with this requirement?

If historical data is not available regarding the volume or mass of ventilation air or mine gas sent to non-qualifying destruction devices prior to offset project commencement, the OPO or APD may provide a reasonable, conservative, and verifiable estimate. OPOs, APDs, and verifiers may consult with ARB when developing and assessing such estimates.

The following provides some context regarding the time periods for which volumes must be calculated and compared. For each eligible methane source, the volume or mass of ventilation air or mine gas that would have been sent to a non-qualifying device for destruction during the reporting period must be calculated and compared per the requirements of subchapters 5.1.1, 5.2.1, 5.3.1, or 5.4.1, depending upon the project type. These sections require the OPO or APD to calculate and compare the volume or mass of ventilation air or mine gas: 1) sent to non-qualifying destruction devices during the reporting period, adjusted for temperature and pressure, if applicable; 2) sent to non-qualifying destruction devices during the three year period prior to offset project commencement (or during the length of time the non-qualifying destruction devices are operational, if less than three years), adjusted for temperature and pressure, if applicable, and averaged according to the length of the reporting period; and 3) sent to the non-qualifying destruction devices during the time period a law, regulation, or legally binding mandate, in place for less than three years prior to offset project commencement, was in effect, adjusted for temperature and pressure, if applicable, and averaged according to the length of the reporting period. The largest of the three quantities must be used. As noted above, the volumes in items 2) and 3) may be estimated, provided that the estimate is reasonable, conservative, and verifiable.

c) OPOs and APDs may choose to use default methane destruction efficiencies (DE_i) provided in Appendix B or site-specific methane destruction efficiencies. Destruction technologies not listed in Appendix B of the MMC Protocol must use site-specific methane destruction efficiencies. Site-specific methane destruction efficiencies that are demonstrated to the satisfaction of the Executive Officer to be equally or more accurate than the default methane destruction efficiencies may be used upon written approval by the Executive Officer. What is the process

for acquiring approval from the Executive Officer? What is the role of the verifier in this process?

If an MMC project intends to use site-specific destruction efficiencies, the OPO or APD should submit a written request for Executive Officer approval to ghgoffsetverification@arb.ca.gov. This request should include:

1) A description of the destruction device including the make, model, installation date, operation dates, and if the device is a qualifying or non-qualifying destruction device;
2) A description of source test methodology used to determine the site-specific destruction efficiency;
3) The source of the methodology used;
4) The date(s) upon which the source test was performed;
5) The name, title, and qualifications and accreditations of the person performing the source testing;
6) The results of the source test and any calculation(s) applied to source test results to derive the proposed destruction efficiency;
7) The proposed destruction efficiency for the destruction device; and
8) The name, title, phone number, and email of a contact person capable of responding to questions regarding the destruction device.

After approval of the site specific destruction efficiency by the Executive Officer, an ARB-accredited offset verifier will verify the accuracy of the information submitted to the Executive Officer during the project's next verification, as well as verify that the site specific destruction efficiency was appropriately applied. If there are any concerns about the information, the verifier should notify ARB.

d) Projects at active surface mines and abandoned underground mines must account for emissions associated with the energy consumed to drill and complete additional wells or boreholes using equations 5.34 and 5.46 of the MMC Protocol, as applicable. Well drilling is often done by a contractor rather than the mine itself and data on energy usage may not be readily available to OPOs and APDs. Is there an alternative method available for accounting for these emissions?

No, the energy used to drill and complete additional wells or boreholes must be accounted for per the requirements of the MMC Protocol. No alternative method is acceptable. ARB suggests that an OPO or APD include a provision in the contract with the entity drilling the well to ensure that the required data can be obtained.

4. Mine-Specific Hyperbolic Emission Rate Decline Curve

a) Local barometric pressure is a required monitoring parameter for deriving mine-specific hyperbolic emission decline curve coefficients. Can local barometric pressure from commonly available weather data be used for barometric pressure readings?

Yes, reputable commonly available data is an acceptable data source for local barometric pressure provided that the requirement to take recordings on at least an hourly basis during the monitoring period is met.

b) Use of mine-specific hyperbolic emission rate decline curve coefficients requires the OPO or APD to demonstrate to the satisfaction of the Executive Officer that the coefficients are equally or more accurate than the default hyperbolic emission rate decline curve coefficients. How should the OPO or APD go about seeking written approval from the Executive Officer? What is the role of the verifier in this process?

An OPO or APD must derive mine-specific hyperbolic emission rate decline curve coefficients using measured data from pre-existing wells or boreholes open to the atmosphere and may choose to include measured data from natural gas seeps following the requirements of subchapters 5.4.1(u), 6.7(f), and table 6.4 of the MMC Protocol. If an MMC project intends to use mine-specific hyperbolic emission rate decline curve coefficients, the OPO or APD should submit a written request for Executive Officer approval to ghgoffsetverification@arb.ca.gov . This request should be submitted well in advance of the end of the reporting period, as Executive Officer approval should take place prior to submission of the Offset Project Data Report. This request should include:

1) The average methane emission rate calculated using available data collected by MSHA over the life of the mine;
2) A description of the monitoring methodologies used to determine the mine gas flow rates, local barometric pressure, and methane concentration of the mine gas after mine closure;
3) A statement that all measurements were of natural flow only with no assistance from vacuum pumps or compressors;
4) The dates when monitoring occurred;
5) A description of how the monitored data was used to develop a correlation between barometric pressure and methane flow rate;
6) A description of how the annual methane flow rate was normalized and plotted against the time since mine closure;
7) The mine-specific hyperbolic decline curve coefficients for use in equation 5.44 of the MMC Protocol;

8) The standard deviation, confidence interval at the 95% confidence level, and certainty bounds of the derived coefficients; and
9) A graph depicting the mine-specific hyperbolic emission rate decline curve with years from mine closure on the x-axis and percent of average methane emission rate while active on the y-axis.

After approval of the mine-specific hyperbolic emission rate decline curve coefficients by the Executive Officer, an ARB-accredited offset verifier will verify the accuracy of the information submitted to the Executive Officer during the project's next verification. If there are any concerns about the information, the verifier should notify ARB.

5. Monitoring Requirements

a) Can a destruction device operate at a mine without being monitored if no credits are attributed to the methane destroyed by the destruction device?

A destruction device that meets the definition of a qualifying destruction device under section 1.2(a)(39) of the MMC Protocol but from which no credits for emission reductions are being claimed may operate at a mine without being monitored. If the destruction device meets the definition of a qualifying destruction device and emission reductions are being claimed or if the destruction device meets the definition of a non-qualifying destruction device, then the methane concentration and volume of ventilation air or mine gas that is sent to the destruction device must be monitored for quantification of both the baseline and the project scenarios.

b) In some cases, a destruction device may become operational prior to having the metering equipment up and running. How does the MMC Protocol handle such situations?

The MMC Protocol defines offset project commencement as the date on which the offset project's mine methane capture and destruction equipment becomes operational. Equipment becomes operational on the date at which the system begins capturing and destroying methane gas upon completion of an initial start-up period of up to 9 months between destruction device installation and project commencement. An initial reporting period can have a start date after the project commencement date. A project that is operational but does not have its metering in place at the time of offset project commencement can choose to delay the start of the initial reporting period until metering equipment is in place. Please note that the start of the initial reporting period is also the start date of the initial crediting period, that projects with an offset project commencement date on or after January 1, 2015 must submit listing information within one year of offset project commencement, and that an Offset Project Data Report for the first reporting period must be submitted within 24 months of listing.

c) Local regulations sometimes require that gas flow metering equipment provide a non-standardized flow rate rather than an actual flow rate or flow rate adjusted to standard conditions. How should this reading be treated under the MMC Protocol?

If gas flow metering equipment provides a non-standardized flow rate instead of a flow rate adjusted to standard conditions, use equation 5.11, 5.23, 5.38, or 5.50, as applicable, to standardize the flow rate of ventilation air or mine gas sent to the destruction device.

d) Ventilation air methane equations that require methane concentrations and flow rates contain the following text: "Methane concentrations and flow rates must be recorded every two minutes with averages calculated at least hourly. If the OPO or APD monitors and records data at a higher frequency, this data may be used within appropriate variables of the above equations to reflect the higher frequency of data collection." Does this language mean that a monitoring system that directly calculates baseline and project emissions every two minutes and sums those values for the reporting period eliminates the need to calculate the average flow rates or methane concentrations? Would such a monitoring system meet the standard of the MMC Protocol?

No, baseline and project emissions must be calculated per the equations and requirements within chapter 5 of the MMC Protocol. The MMC Protocol does allow for more frequent readings, but also requires that the data be incorporated as appropriate variables within the equations as specified in the MMC Protocol. When equations call for the use of weighted or hourly averages for gas flow or concentration, those values must be calculated and used as inputs into the equation. Moreover, the values used need to be verifiable. Any output from calculations performed by a monitoring system must be auditable back to the raw data from mine gas or ventilation air flow and methane concentration readings.

e) The MMC Protocol requires mine gas flow rates to be monitored continuously. Does the use of a differential pressure flow meter meet the continuous flow rate monitoring requirement even though it is only measuring a pressure differential (which can be converted to a flow rate)?

Yes, this is an acceptable form of flow rate monitoring provided that recordings are properly converted to a flow rate and are taken at the frequency required by the MMC Protocol.

6. Instrument Quality Assurance and Quality Control

a) The MMC Protocol sets a 5% accuracy threshold for monitoring equipment used in projects. Is the accuracy threshold (allowable error) of 5% applied to the reading or to the scale of the instrument?

The accuracy threshold of within ±5% is applied to the reading relative to the reference value. Monitoring equipment must be checked for accuracy per subchapter 6.2 of the MMC Protocol. An OPO or APD may only use meters that meet the accuracy requirements set forth in the MMC Protocol.

b) Subchapter 6.2(f) of the MMC Protocol states that if the check on a piece of equipment reveals accuracy beyond a ±5% threshold (reading relative to the reference value), corrective action such as calibration by the manufacturer or a certified service provider is required for that piece of equipment. Is there a timeline for when corrective action must be taken?

Any required corrective action must be taken prior to the completion of the verification. If corrective action is not taken prior to the completion of the verification, this may constitute nonconformance with the protocol, and a positive verification finding may not be issued. Further, emission reductions must be calculated using adjusted values for the entire period from the last successful check until when corrective action is taken based on procedures in subchapter 6.2(g).

c) Subchapter 6.2(a) of the MMC Protocol requires monitoring instruments and equipment to be checked per manufacturer specifications by a trained professional. Who qualifies as a trained professional?

A trained professional is any individual who has experience, training, or certification as a calibration technician, or training in calibration engineering technology or metrology. The verifier will use professional judgment to review and assess the qualifications of the trained professional.

7. Early Action

a) If the start date for an early action project, meeting the requirements of the respective early action protocol, does not align with the criteria for project commencement under the MMC Protocol, does an early action project using an approved early action quantification methodology need to adjust their commencement date when transitioning to the MMC Protocol?

No, an early action project whose project commencement date meets the requirements of the approved early action quantification methodology can keep their start date when transitioning to the MMC Protocol, so long as the project meets all other requirements of

the MMC Protocol by the time the project enters the compliance program. The transitioned project will have a new crediting period start date.