Compliance Offset Protocol Mine Methane Capture Projects

Capturing and Destroying Methane from U.S. Coal and Trona Mines

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Presentation Outline

- California's Cap-and-Trade Program
- Role of Offsets and Offset Criteria
- California Air Resources Board (ARB) Compliance Offset Protocol for Mine Methane Capture Projects (MMC Protocol)
- Approved Early Action Quantification Methodologies
- Important Steps and Deadlines for Project Developers

Cap-and-Trade Program

- California's Cap-and-Trade Program is one of a suite of measures to reduce greenhouse gas (GHG) emissions under Assembly Bill 32
- The "cap" limits total GHG emissions from all regulated sources and declines over time—reduces emissions
- Participants can "trade" State-issued compliance instruments—creates flexibility, reduces costs of compliance
- Cap-and-Trade Regulation effective January 1, 2012
- Emissions compliance began January 1, 2013

Role of Offsets

- Entities may use offsets to satisfy up to 8% of their compliance obligation
- Offsets credits are issued directly by ARB or by a linked jurisdiction
  - California and Quebec linked their Cap-and-Trade programs at the beginning of 2014
- ARB-issued offsets must result from Board-adopted compliance offset protocols or Board-approved early action offset quantification methodology
  - MMC Protocol is the 5th ARB-adopted compliance offset protocol
  - 3 ARB-approved early action methodologies for MMC

Offset Criteria

- Emission reductions must meet AB 32 criteria: real, additional, quantifiable, permanent, verifiable, and enforceable
- Cannot credit emission reduction activities already covered under the cap
  - No offset credits for fossil fuel or electricity displacement
- Must meet the same accuracy requirements as all other reported GHG emissions
- Although participation in the offset program is voluntary, all participants are subject to regulatory requirements, including oversight and enforcement

MMC Compliance Protocol: Overview

- MMC Protocol was adopted by the California Air Resources Board in April 2014
- MMC Protocol came into effect on July 1, 2014
- Purpose: To quantify GHG emission reductions associated with the capture and destruction of methane that would otherwise be vented into the atmosphere as a result of mining operations at:
  - Active underground coal and trona mines
  - Active surface coal and trona mines
  - Abandoned underground coal mines

MMC Compliance Protocol: Eligible Mine Types

- **Active underground mine:** A permitted mine usually located several hundred feet below the earth's surface. A mine must be classified by the Mine Safety and Health Administration (MSHA) as active, intermittent, or temporarily idle in order to be eligible for an active underground mine methane drainage or ventilation air methane activity
- **Active surface mine:** A permitted mine in which the mineral lies near the surface and can be extracted by removing the covering layers of rock and soil. A mine must be classified by the Mine Safety and Health Administration (MSHA) as active, intermittent, or temporarily idle in order to be eligible for an active surface mine methane drainage activity
- **Abandoned underground mine:** A mine where all mining activity including mine development and mineral production has ceased, mine personnel are not present in the mine workings, and mine ventilation fans are no longer operative. A mine must be classified by MHSA as abandoned or abandoned and sealed in order to be eligible for abandoned mine methane recovery activity.

MMC Compliance Protocol: Eligible Project Activities

- Projects must install and operate equipment to capture and destroy mine methane or ventilation air methane that would otherwise be vented into the atmosphere as a result of mining operations
- Four eligible project activities
  - Active underground mine ventilation air methane
  - Active underground mine methane drainage
  - Active surface mine methane drainage
  - Abandoned underground mine methane recovery

MMC Compliance Protocol: Eligible Methane Sources

- Methane source means a methane source type (i.e., ventilation shafts, pre-mining surface wells, post-mining gob wells, etc.) in the aggregate.
- The protocol stipulates what which methane sources are eligible for each project activity type
  - Active Underground Mine Ventilation Air Methane Activities
    - Ventilation systems
    - Methane drainage systems from which mine gas is extracted and used to supplement ventilation air
  - Active Underground Mine Methane Drainage Activities
    - Pre-mining surface wells
    - Pre-mining in-mine boreholes
    - Post-mining gob wells

MMC Compliance Protocol: Eligible Methane Sources

- Active Surface Mine Methane Drainage Activities
  - Pre-mining surface wells
  - Pre-mining in-mine boreholes
  - Existing coal bed methane wells that would otherwise be shut-in and abandoned as a result of encroaching mining
  - Abandoned wells that are reactivated
  - Converted dewatering wells
- Abandoned Underground Mine Methane Recovery Activities
  - Pre-mining surface wells drilled into the mine during active mining operations
  - Pre-mining in-mine boreholes drilled into the mine during active mining operations
  - Post-mining gob wells drilled into the mine during active mining operations
  - Surface wells drilled after the cessation of active mining operations

MMC Compliance Protocol: Methane Source Boundaries

- Active Underground Mine Ventilation Air Methane
  - All methane in ventilation air collected from ventilation system
  - Mine gas extracted from drainage system used to supplement VAM
- Active Underground Mine Methane Drainage
  - Mine gas extracted from strata up to 150 meters above and 50 meters below a mined seam through pre-mining surface wells and pre-mining in-mine boreholes
  - Mine gas extracted through post-mining gob wells
- Active Surface Mine Methane Drainage
  - Mine gas extracted from all strata above and up to 50 meters below a mined seam
- Abandoned Underground Mine Methane Recovery
  - Mine gas extracted from strata up to 150 meters above and 50 meters below a mined seam

MMC Compliance Protocol: Qualifying Destruction Devices

- Captured methane must be destroyed through an eligible end use management option using a qualifying destruction device
- In order to be considered a qualifying destruction device, the device must not have been operational at the mine prior to offset project commencement
  - Exception for abandoned mines
  - Offset project commencement is the date on which methane capture and destruction equipment begins capturing and destroying methane upon completion of an initial start-up period

MMC Compliance Protocol: Non-Qualifying Destruction Devices

- If a destruction device does not meet the definition of a qualifying destruction device it is considered to be a non-qualifying destruction device
- Under the protocol, both qualifying and non-qualifying destruction devices must be monitored for quantification of the baseline and the project scenarios
- Mine methane from any individual shaft, well, or borehole connected to a non-qualifying destruction device at any point during the year prior to offset project commencement is NOT eligible for crediting

MMC Compliance Protocol: End Use Management Options

- Captured methane must be destroyed through an eligible end use management option using a qualifying destruction device
- Restrictions on injection into a natural gas pipeline
  - Pipeline injection is NOT an eligible end use management option for active underground mines or abandoned underground mines that injected into a pipeline while active
  - If an active underground mine that historically injected into pipeline ceases to do so, mine methane from that methane source is ineligible for emission reduction under the protocol
  - If an active underground mine begins to inject mine methane into a natural gas pipeline while the offset project is ongoing, mine methane from that source is ineligible for emission reductions going forward.

MMC Compliance Protocol: General Eligibility

- Mines must be located in the United States; mines on federal lands are eligible
- Offset Project Operator (OPO) must have the legal authority to implement the project and be either
  - Mine operator
  - Entity that owns or leases the equipment used to capture or destroy mine methane
- Multiple abandoned mines with multiple mine operators may report and verify together as a single project if they meet the criteria of section 2.4(c) of the MMC Protocol

MMC Compliance Protocol: Ineligible Activities

- MMC projects must not:
  - Account for virgin coal bed methane (CBM) extracted from coal seams outside the extents of the mine
  - Use CO_2, steam, or any other fluid/gas to enhance mine methane drainage
  - Occur at surface mines that employ mountaintop removal mining methods
  - Occur at flooded abandoned mines or in flooded sections of abandoned mines

MMC Compliance Protocol: Basics of Quantifying GHG Emission Reductions

- OPO/APD must use the activity type-specific calculation methods provided in the MMC protocol to determine baseline and project GHG emissions
- GHG emission reductions from an MMC project are quantified by comparing actual project emissions to project baseline emissions at the mine
- GHG emission reductions must be quantified over a consecutive twelve month “reporting period”
- Emission reductions are calculated in $MTCO_2e$
- Global warming potential values must be determined consistent with the definition of Carbon Dioxide Equivalent in the CA Mandatory Reporting Regulation

MMC Compliance Protocol: Quantifying Baseline Emissions

- Under the protocol, both qualifying and non-qualifying destruction devices must be monitored for quantification of the baseline and the project scenarios
- Baseline emissions consist of:
  - CO_2 emissions from the destruction of methane
  - CH_4 emissions from the release of methane
- Emissions from the destruction of methane
  - OPO/APD calculates and compares the amount of methane sent to non-qualifying destruction devices:
    - During the reporting period
    - During the 3 years prior to offset project commencement
    - During the time period when a law, regulation, or legally binding mandate (in place for less than 3 years) was if effect

MMC Compliance Protocol: Quantifying Baseline Emissions

- Emissions from the release of methane:
  - Active Mines
    - Use volume and methane concentration of mine gas sent to all qualifying and non-qualifying destruction devices
    - Baseline methane emissions from pre-mining wells only accounted for when the well is mined through
  - Abandoned Mines
    - Calculated using a hyperbolic emission rate decline curve
    - Use of default hyperbolic emission rate decline curve coefficients or use of site-specific coefficients derived from measured data
    - The emission reductions in any given reporting period cannot exceed the baseline emissions for that reporting period as calculated by the decline curve

MMC Compliance Protocol Quantifying Project Emissions

- Project emissions consist of:
  - CO_2 emissions from the destruction of methane
  - CH_4 emissions from uncombusted gas sent to destruction devices
  - Emissions from energy consumed to power additional equipment used to capture and destroy methane
- Project emissions must include the emissions from the destruction of all mine gas from pre-mining wells that took place during the reporting period regardless of whether the well is mined through
- Mine methane that is still vented during in the project scenario is not accounted for in the project or baseline emissions since it is vented in both scenarios

MMC Compliance Protocol: Monitoring Parameters for Quantification

- Primary monitoring parameters
  - Flow rate of ventilation air or mine gas to a destruction device
  - Methane concentration of ventilation air or mine gas
  - Time during which destruction device was operational
  - Temperature and pressure
  - Destruction device efficiency (default or mine specific)
- The mine gas volume and methane concentration must be disaggregated by methane source
- QA/QC requirements for monitoring equipment
- Conservative data substitution methodologies for flow rate and methane concentration allowed when data gaps occur under limited circumstances

MMC Compliance Protocol: Reporting & Verification

- OPOs/APDs must submit an Offset Project Data Report (OPDR) within four months of the conclusion of each reporting period
- Projects that produce ≥ 25,000 $MTCO_2e$ in a reporting period must be verified annually; for reporting periods that produce < 25,000 $MTCO_2e$, the OPO/APD may choose to undergo verification that covers two consecutive reporting periods
- Verifications must be done by ARB-accredited verification body including a MMC-specific verifier
- Offset Verification Statement must be received within 11 months of the end of the reporting period

Approved MMC Early Action Quantification Methodologies

- Climate Action Reserve's Coal Mine Methane Project Protocol version 1.0 and version 1.1
- Verified Carbon Standard VMR0001 Revisions to ACM0008 to Include Pre-drainage of Methane from an Active Open Cast Mine as a Methane Emission Reduction Activity Methodology, v1.0
- Verified Carbon Standard VMR0002 Revisions to ACM0008 to Include Methane Capture and Destruction from Abandoned Coal Mines Methodology, v1.0.
  - For VMR001 and VMR002, no ARB offset credits will be issued for GHG emission reductions credited by an Early Action Offset Program based on data reported by the Offset Project Operator or Authorized Project Designee that included emissions from the production of power, heat or supply to gas grid replaced by the project activity in the baseline (identified as $BE_{Use,y}$ in ACM0008)

Process and Deadlines to Convert Early Action Voluntary Program Credits to ARB Compliance Offset Credits

- ARB offset credits may be issued to projects that achieved verified greenhouse gas emission reductions between January 1, 2005 and December 31, 2014
- Register MMC project with Early Action Offset Program (EAOP) by January 1, 2015
- Report and verify according to rules of the EAOP, verification must occur by September 30, 2015
- If verification is positive, project is issued offset credits by the EAOP

Process and Deadlines to Convert Early Action Voluntary Program Credits to ARB Compliance Offset Credits

- List early action project with ARB by January 1, 2016
- OPO/APD contracts with an ARB-accredited verification body to conduct a desk review of each early action reporting period
  - Verifier assesses conflict of interest pursuant to section 95979
  - If desk review findings are positive and ARB concurs, credits will be issued
  - If desk review findings are negative, OPO/APD may choose to undergo a full verification
- The OPO/APD must register with ARB in the Compliance Instrument Tracking System Service (CITTS) prior to the issuance ARB Offset Credits

Transitioning An Existing Voluntary Offset Project to the MMC Compliance Protocol

- If the early action project intends to transition to a compliance project, it must be listed as a compliance project by February 28, 2015
- Compliance projects are listed with an Offset Project Registry

Early Action Offset Programs & Offset Project Registries

- ARB has approved three Early Action Offset Programs and Offset Project Registries
  - American Carbon Registry (ACR)
    - http://americancarbonregistry.org
  - Climate Action Reserve (The Reserve)
    - http://www.climateactionreserve.org
  - Verified Carbon Standard (VCS)
    - http://www.v-c-s.org

ARB Web Resources

- MMC Compliance Offset Protocol:
  http://www.arb.ca.gov/regact/2013/capandtrade13/ctmmcprotocol.pdf
- MMC Webpage:
  http://www.arb.ca.gov/cc/capandtrade/protocols/mmcprotocol.htm
- Compliance Offset Program:
  http://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm
- Cap-and-Trade Program:
  http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm

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