

# **Discussion of Potential New Compliance Offset Protocols**

California Air Resources Board  
August 19, 2013

# Webcast Information

- Slides posted at:  
<http://www.arb.ca.gov/cc/capandtrade/meetings/meetings.htm>
- E-mail questions to:  
auditorium@calepa.ca.gov

# Agenda

- Status update on proposed cap-and-trade amendments
- Status update on Rice Cultivation Protocol
- Proposed Mine Methane Capture Protocol
  - Mine Methane Capture Protocol development
  - Presentation of Mine Methane Capture Protocol discussion draft
  - Environmental analysis of Mine Methane Capture Protocol
  - Proposed early action methodologies for Mine Methane Capture
  - Timeline for Mine Methane Capture Protocol
  - Questions/discussion of Mine Methane Capture Protocol

# Update on Proposed Cap-and-Trade Amendments

- Public workshop on the proposed regulatory amendments - July 18, 2013
- A discussion draft available at:  
<http://www.arb.ca.gov/cc/capandtrade/meetings/meetings.htm>
- Amended regulation and proposed Compliance Offset Protocol available in September 2013
- Consideration expected at the October 2013 Board hearing

# Status Update on Rice Cultivation Protocol

- Staff has been working with stakeholders to develop a Rice Cultivation protocol
- Issues identified during stakeholder process:
  - Early drainage activities effects on:
    - Late broods
    - Mosquito abatement
    - Wetlands
  - Rice straw baling effects on:
    - Bird populations

# Status Update on Rice Cultivation Protocol (2)

- Rice Cultivation Protocol expected Board consideration spring 2014
- Continued technical workgroup meetings
- Release of discussion draft of protocol
- Additional time for DNDC calibration and validation
- DNDC contract
- Interested parties should contact Yachun Chow, Staff Lead for Rice Cultivation Protocol at [ychow@arb.ca.gov](mailto:ychow@arb.ca.gov)

# Mine Methane Capture Protocol Development

- Process for the review and approval of Compliance Offset Protocols available at:  
<http://www.arb.ca.gov/cc/capandtrade/compliance-offset-protocol-process.pdf>.
- A public workshop to announce the development of new Compliance Offset Protocols - March 28, 2013
- Four MMC technical working group meetings held in the spring and summer
- Meeting materials are available at:  
<http://www.arb.ca.gov/cc/capandtrade/protocols/mmcprotoco1.htm>.

# Technical Working Group Issues

- Assessment of natural gas pipeline injection business-as-usual
- Feasibility of projects on federal lands
- Abandoned mine baseline emissions
- Spatial and temporal boundaries
- Non-methane hydrocarbons
- Project expansion

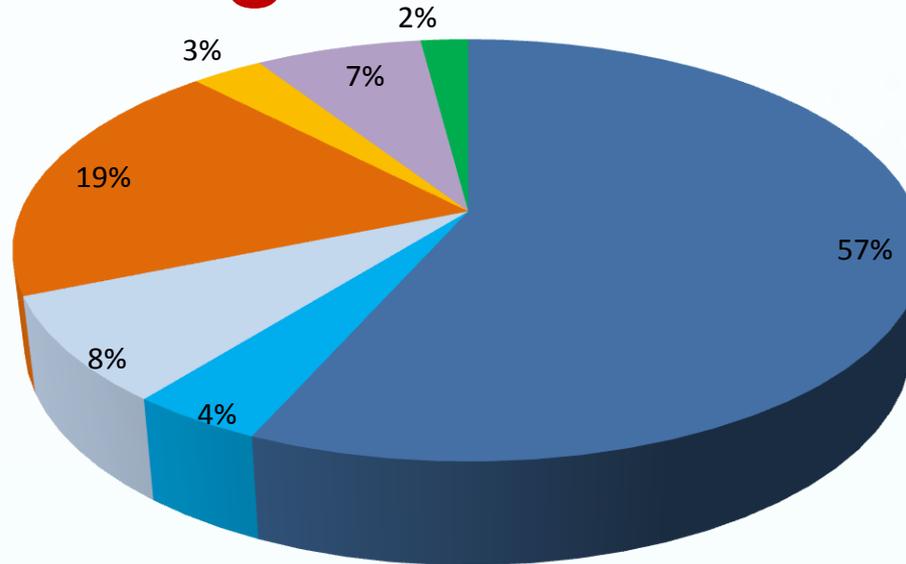
# Offset Criteria

- Real, additional, quantifiable, permanent, verifiable, and enforceable
- Cannot credit covered activities (i.e., fossil fuel or electricity displacement)
- Must meet the same accuracy requirements as all other reported GHG emissions
- Participation in offset projects is voluntary, but once participating, project activities and participants are subject to all regulatory requirements

# Purpose of MMC Protocol

- 69.9 MMtCO<sub>2</sub>e mining methane emissions in 2011
- Nearly 12% of U.S. anthropogenic methane emissions and 1% of total U.S. GHG emissions
- Incentivize the reduction of GHG emissions from mining activities in the U.S.
- Quantify GHG emission reductions from capture and destruction of methane resulting from mining operations

# U.S. Mining Emissions (2011)



- Active Underground Coal Mines: VAM Vented (39.5 MMtCO<sub>2</sub>e)
- Active Underground Coal Mines: Drainage Vented (2.9 MMtCO<sub>2</sub>e)
- Active Underground Coal Mines: Post-mining (5.8 MMtCO<sub>2</sub>e)
- Active Surface Coal Mines: Vented (13.0 MMtCO<sub>2</sub>e)
- Active Surface Coal Mines: Post-mining (2.1 MMtCO<sub>2</sub>e)
- Abandoned Underground Coal Mines: Vented (4.9 MMtCO<sub>2</sub>e)
- Active Trona Mines: Vented (1.7 MMtCO<sub>2</sub>e)

Adapted from data presented in *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2011* (U.S. EPA 2013) and *Overview of Proposed Abandoned Mine Methane Protocol* (Ruby Canyon Engineering, Inc. 2013)

# MMC Protocol Structure

- Activity types:
  - Active underground mine ventilation air methane activities
  - Active underground mine methane drainage activities
  - Active surface mine methane drainage activities
  - Abandoned underground mine methane recovery activities
- VAM and drainage activities may operate as a single project or independently
- An abandoned underground mine project may include multiple mines

# MMC Project Definition

- Credits issued for reductions from the installation and operation of a device or set of devices that capture and destroy methane
- Eligible methane sources and spatial boundaries
- Eligible end-use management options
- GHG assessment boundaries
- Quantification methodologies

# General MMC Project Eligibility Criteria

- All coal and trona mines within the U.S.
- Offset Project Operator must demonstrate their legal authority to implement the offset project
- Continuous monitoring, annual reporting, and verification
- The reporting period: 1 year
- The crediting period: 10 years
- Offset project commencement date must be after December 31, 2006

# Activities Excluded from the MMC Protocol

- Virgin coal bed methane (CBM) capture
- Mountaintop removal
- CO<sub>2</sub>, steam, or any other fluid/gas to enhance mine methane drainage
- Flooded abandoned mines
- Destruction devices operating prior to project commencement
- Ventilation shafts, wells, and boreholes connected to non-qualifying devices prior to project commencement

# Additionality

- Activities must not be required by law, regulation, or any legally binding mandates
- Must be activities that would not otherwise occur in a conservative business-as-usual scenario
- The MMC Protocol assesses additionality in two ways:
  - Legal Requirements Test
  - Performance Standard Evaluation

# Additionality (2)

- Legal Requirements Test
  - No regulations currently exist requiring methane destruction
- Performance Standard Evaluation
  - Establishes a threshold that is better than a conservative estimate of business-as-usual
  - End-use management options for captured methane have been deemed eligible or ineligible

# Eligible End Use Management Options

	Active Surface Mine Methane Drainage	Abandoned Underground Mine Methane Recovery	Active Underground Mine VAM	Active Underground Mine Methane Drainage
Oxidation	X	X	X	X
Production of transportation fuel (LNG/CNG)	X	X	Not feasible	X
Generation of thermal power and electricity	X	X	Not feasible	X
Flaring	X	X	Not feasible	X
Injection into natural gas pipeline	X	X	Not feasible	Not additional
Other, not listed	X	X	X	X

# Quantification Methodology

- Emission reductions are the difference between project emissions and baseline emissions
- Project emissions take into account:
  - CO<sub>2</sub> from additional energy consumed to capture and destroy CH<sub>4</sub>
  - CO<sub>2</sub> from the combustion of CH<sub>4</sub>
  - Uncombusted CH<sub>4</sub> sent to destruction device
- Baseline emissions take into account:
  - CO<sub>2</sub> from the combustion of CH<sub>4</sub>
  - CH<sub>4</sub> from the release of mine methane

# Quantification Methodology (2)

- Active underground and surface mine baseline CH<sub>4</sub> emissions are the difference between the amount of methane sent to destruction devices in the project and baseline scenarios
- Abandoned mine baseline CH<sub>4</sub> emissions are the lesser of:
  - Calculated by a hyperbolic emissions rate decline curve
  - Measured methane sent to all qualifying and non-qualifying devices
- CH<sub>4</sub> still vented in the project scenario is not accounted for since it is vented in both scenarios

# Hyperbolic Emissions Rate Decline Curve

- Decline curve is directly related the gassiness of the mine
- Relies upon the following inputs:
  - Time since mine closure
  - Methane emissions rate at time of closure
  - Default decline curve coefficients for sealed or venting mine, or mine-specific coefficients
- Emission reductions from abandoned mines must be  $\leq$  the baseline emissions for that reporting period and are subject to an uncertainty deduction

# Leakage

- Considered leakage from an increase in coal production due to reduced constraints on mining as a result of an increase in drainage capacity
- Identified in the U.N.'s Clean Development Mechanism methodology
- Not applicable to mines in the United States
  - Coal revenue sufficient to incentivize drainage
  - Primarily an issue in China where gob wells are rare

# Environmental Analysis

- Environmental analysis (EA) for proposed actions which may result in significant environmental impacts
  - Prepared according to requirements of ARB's certified program under the California Environmental Quality Act (CEQA)
- The environmental analysis will be included as a chapter within the Staff Report and covers:
  - Foreseeable Methods of Compliance
  - Potential for Adverse Impacts
  - Feasible Mitigation Measures

# Environmental Analysis (2)

- The CEQA checklist is used to identify and evaluate potential impacts to environmental resource areas based on foreseeable methods of compliance
- Foreseeable methods of compliance include:
  - Gas Extraction
  - Gas Capture
  - Gas Transport
  - Gas Processing
  - Gas Destruction
  - Methane Destruction Monitoring

# Proposed Early Action Methodologies for MMC

- Proposing early action methodologies:
  - Climate Action Reserve's Coal Mine Methane Project Protocol version 1.0, October 7, 2009
  - Climate Action Reserve's Coal Mine Methane Project Protocol version 1.1, October 26, 2012
- ARB offset credits may be issued to projects that achieved verified greenhouse gas emission reductions between January 1, 2005 and December 31, 2014 using these methodologies
- Proposed amendments extend the early action listing deadline for MMC projects to January 1, 2015

# Timeline for Mine Methane Capture Protocol

- August 19, 2013: Workshop to present discussion draft
- August 22, 2013: Informal comments on discussion draft must be received by close of business
- September 4, 2013: Public release of staff report, including an environmental analysis, and proposed Compliance Offset Protocol for Board consideration
- September 9, 2013: 45-day comment period begins
- October 24 & 25, 2013: Board hearing in Sacramento
- If adopted, effective date will be in 2014

# Seeking Comment and Input

- Parameters for determining that a CBM well would be shut in as a result of encroaching mining
- Maximum on the absolute minimum (horizontal) distance for wells that are mined past rather than through
- ASTM methodology for measuring nitrogen and oxygen levels in mine gas to demonstrate that a pre-mining surface well is mined through
- How to deal with uncertainty in abandoned mine baseline calculation
- Scope and content of environmental analysis

# Program Contacts

Please provide comments and input by close of business on Thursday, August 22, 2013 to:

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# Questions and Discussion