

“Manure Digester” Protocol Workshop: CCAR Updates & ARB’s Adoption Process

July 11th, 2008



Overview

- Introductions
- Overview & Background
- CCAR Updates
- ARB Process
- Discussion
- Next Steps

Background

Manure Digesters

- Adoption of protocol is an AB32 Early Action Item
- Scoping Plan Draft identifies digesters as a potential strategy for meeting AB32 goals
<http://www.arb.ca.gov/cc/cc.htm>
 - Recommends that digesters play a role in achieving voluntary reductions
 - Re-assess role in 5 years
- Currently, only digestion of manure is addressed

Manure Digesters

- Store manure & enhance digestion (anaerobic = in the absence of oxygen)
- Capture methane biogas produced by the naturally occurring anaerobic microbes (methanogenic bacteria)
- Result in combusting or otherwise utilizing biogas (for energy, heat, or later use)
 - Purifying & injecting into natural gas pipelines
 - Producing electricity using fuel cells, engine/generator sets, microturbines, etc.
 - Burning or flaring

CCAR's Livestock Project Reporting Protocol

- Provides methodologies for calculating greenhouse gas (GHG) benefits of manure digesters
- Allows for additions, revisions, & updates

Source of Protocol Methodologies

- Derived from international methodologies
 - Kyoto Protocol's Clean Development Mechanism (CDM)
 - Protocol ACM0010
 - EPA's Climate Leaders Program
 - Draft Manure Management Offset Protocol

CCAR Protocol Details

- Designed for bovine & swine manure digesters
- Minimum Required Inputs:
 - Animal population & type (monthly)
 - Ambient average temperature (monthly)
 - Methane concentration (at least quarterly)
 - Volume of biogas (continuous monitoring)
- Other Inputs
 - Mostly found in look-up tables

CCAR Protocol Details, cont.

Project boundaries

- Includes everything affected by installation of a digester
 - Waste production
 - Waste treatment & storage
 - Waste disposal – e.g. changes in emissions resulting from transporting manure

CCAR Protocol Development Process

- Initiated Livestock Project Reporting Protocol development in April 2006
 - Extensive public/stakeholder review which involved
 - CA Farm Bureau, CA Dept. of Food & Ag, Center for Energy Efficiency & Renewable Technology, Environmental Defense, UC Davis, EPA, Western United Dairymen, SMUD, Bioenergy Solutions, Provost & Pritchard, CARB, and many others
- Adopted by CCAR Board in June 2007
- Updated by CCAR June 2008
- Being presented to CCAR Board August 2008

CCAR Updates

- And now CCAR will give a detailed presentation on the updates to the protocol

Updates to The Livestock Project Reporting Protocol



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Policy Associate

California Climate Action Registry

The Protocol Workgroup



- CA Air Resources Board
- CA Department of Food and Agriculture
- California Farm Bureau
- Western United Dairymen
- U.S. EPA
- The Center for Energy Efficiency and Renewable Technology
- Environmental Defense
- UC Davis
- Applied Geosolutions
- AgCert
- The Dolphin Group
- Inland Empire Utility Agency
- Manitoba Agriculture, Food and Rural Initiatives
- Sustainable Conservation

Version 2.0



- Main Update: Removal of requirement for site-specific feed nutrition data
 - “Dominant” livestock Volatile Solids calculation (equation 2d) replaced with EPA State-Specific VS Tables.
- This change was made based on user/stakeholder feedback :
 - Site specific feed nutrition data requirements for eq. 2d VERY hard to come by.
 - Feed data would be difficult to verify.



Other updates

- General formatting adjustments to enhance readability.
- Variable names in equations 4a-4c changed for consistency.
- Updated project monitoring section to include guidance on monitoring plans, reporting parameters, and record keeping.
- Added default lookup table for Typical Animal Mass values.
- Added default Methane Destruction Efficiencies for various combustion devices.

Updates cont'd



- Equation 4a equation adjusted, and additional calculation guidance given for determining the mass flow of CH₄ (tCH₄/month), and for accounting for the Temp and Pressure of the biogas.
- $Mass_L/1000$ terms removed from equations 2c, 4c.
- Default percentage of VS leaving digester as effluent changed from 30% to 20%
- De minimis CO₂ is required to be reported using best estimates.
- Verification protocol changes:
 - Added guidance for site visits.
 - Added guidance determining materiality.

Livestock Calc Tool and Data Requirements



- Beta Version Livestock Calculation Tool updated to reflect changes.
- Site specific data requirements for calculations:
 - Livestock Population by Category
 - Monthly Average Temperature
 - Baseline Manure Handling Data (what waste went to what storage/treatment system)
 - BCS Collection and Combustion efficiency
 - Biogas Flow, Temp, Pressure
 - CH₄ Content
 - Non-BCS waste handling data
 - CO₂ from stationary and mobile combustion



- The Climate Action Reserve is CCAR's emission reduction registry.
- Livestock Protocol V 2.0 includes guidance for project submittal and verification for the Reserve.
- Public can view all project documentation and emission reduction reports at:

<http://www.climateregistry.org/offsets/access-the-reserve.html>

Contact Information



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How It Works in the Real World

- Example dairy
 - 1500 milkers, 500 dry, 1500 heifers
 - Temperature (monthly avg): 20°C (68°F)
 - Made some basic/simplifying assumptions
 - 100% of manure treated anaerobically
 - 100% methane capture & combustion, etc.
 - Measured gas 120,000 scf/d (70% methane)
 - ~20,000 MTCO₂E per year in reductions

Areas to Address

- Impacts on criteria pollutants (particularly NO_x)
 - Backsliding is not allowed under AB32
 - Equipment must be in compliance with all applicable district and state air regulations, and appropriately permitted
- All biogas must first be cleaned (sulfur, etc.) before being utilized
- Since most manure digesters will be on dairies, and most dairy cows are in San Joaquin's non-attainment air basin, low NO_x pathways & technologies will be a necessity

Areas to Address

- Feasibility
 - Financial
 - Legal
 - Contractual
- Current Needs for Improving Digester Adoption
 - Improve interagency coordination
 - Streamline permits
 - Improve grid access
- Recommendations? Suggestions?

ARB Process/Timeline

- Protocol comments must be submitted to CCAR 2 weeks from today (by 5pm on July 25th)
- Updated protocol will be presented to CCAR's Board in August
- Updated calculation methodologies will be presented to our Board for adoption during the September 25/26 meeting in Diamond Bar

For More Manure-Related Information

- **Manure Management Websites:**
 - ARB Manure Management homepage
<http://www.arb.ca.gov/ag/manuremgmt/manuremgmt.htm>
 - Manure management protocols
<http://www.arb.ca.gov/ag/manuremgmt/protocols/protocols.htm>
- **Manure management list serve:**
 - <http://www.arb.ca.gov/listserv/manuremgmt.htm>

Contacts

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