ORGANIZATIONS THAT SUBMITTED COMMENTS ON THE MANURE MANAGEMENT PROJECT REPORTING PROTOCOL

1. AgCert International (AgCert) *
2. Bion Environmental Technologies, Inc. (Bion)
3. Blue Source, LLC
4. California Air Resources Board (CARB)
5. California Farm Bureau Federation (CFBF)*
6. Center on Race, Poverrty and the Environment (CRPE)
7. The Community Alliance for Responsible Environmental Stewardship (CARES)*
8. EcoSecurities
9. Environmental Products and Technologies Corporation (EPT Corp)
10. Eastern Research Group (ERG)
11. Environmental Resources Trust, Inc. (ERT)
12. Hall Associates (Hall)
13. Mid American Energy (Mid American)
14. Sacramento Municipal Utility District (SMUD)
15. West National Technology Support Center USDA-NRCS (USDA-NRCS)
16. Western United Dairymen (WUD)*
17. World Resources Institute (WRI)

* These four organizations submitted their comments together as a group.

SUMMARY OF PUBLIC COMMENTS

A. GENERAL COMMENTS

A1. Applicability of the protocol to specific manure management systems (AgCert, Bion, CFBF, CARES, EPT Corp, ERG, ERT, WUD)
Currently, the name of the Draft Protocol is *Manure Management Project Reporting Protocol*. However, the Draft Protocol only refers to "*emissions reductions associated with installing a manure biogas control system*" for "*manure treated and stored under anaerobic conditions.*" There are many manure management systems and these systems (or modifications to these systems) may also result in reductions in GHG emissions. Examples include reducing dietary protein to reduce nitrogen excretion, improving feed efficiency to reduce nitrogen excretion, solid manure management to reduce methane (CH4) and nitrous oxide (N2O) emissions, managing manure as compost as opposed to managing manure as slurry, and time and type of land application to reduce N2O emissions. Our concern is that the name of the Draft Protocol is misleading since it implies that the Draft Protocol refers to all manure management systems, as opposed to the Protocol's focus on manure biogas capture systems and related combustion technologies. It is our understanding that while the Draft Protocol will only apply to anaerobic digesters with biogas capture systems, it is not the Registry's intent to restrict other manure management techniques resulting in GHG reductions from being implemented outside of this Draft Protocol. A suitable alternative name for the Draft Protocol could be *Manure Management Project Reporting Protocol: Biogas Capture Systems for Dairies with Anaerobic Lagoons.* Alternatively, the Registry should make it clear to project developers within the Draft Protocol that other manure management projects may be eligible for GHG reduction credits. Finally, another approach CCAR could adopt is leave the name of the Draft Protocol as is and classify the 'methane capture and combustion' aspect of the existing Draft Protocol as 'Part A' and then classify new (manure management) techniques/technologies as "Parts B, C, D, etc." of this Protocol and add them accordingly as they develop.

A2. Reductions in N2O (AgCert, CFBF, CARES, ERG, ERT, Hall, Mid American, WUD)
Although the Intergovernmental Panel on Climate Change (IPCC)3 proposes a N2O emission rate from manure management systems, the 2006 IPCC Guidelines report that the complex emissions pathway associated with the nitrification-denitrification cycle (nitrogen contained in ammonia in livestock waste to N2O) result in uncertainties associated with the N2O emission factor. As a result of these uncertainties, the Draft Protocol does not include a method for calculating reductions in N2O emissions from the anaerobic digester. However, the Draft Protocol requires that baseline N2O emissions and increases in N2O production be reported to the Registry, even though the Draft Protocol concedes that calculations of N2O increases are equally as uncertain as calculations of N2O decreases. The Draft Protocol attributes this approach to "conservativeness," a term which is undefined and unclear in this context. The Registry's approach with respect to N2O reductions is not consistent with the approach taken in the Clean Development Mechanism (CDM) Approved Consolidated Baseline Methodology (ACM) 00104, the U.S. Environmental Protection Agency (USEPA) Climate Leaders Draft Offset Protocol (Draft Offset Protocol)5 and the Environmental Resource Trust (ERT) Protocol6. We recommend further discussion of this issue and that prior to its resolution, N2O emissions (baseline, increase or decreases) be removed from the Protocol, although the Protocol could include a discussion of the N2O emission issues and that this issue will be revisited in subsequent Protocol revisions.

A3. The monthly calculation of methane (ERG, ERT)
The main issue with the monthly calculation as presented is the estimation of volatile solids that will be present and available for conversion to methane in the manure management system (referred to in Equations 2a and 2b as "methane source 's'"). As written, the equation only accounts for volatile solids excreted by the livestock categories during the monitoring period (presumably one month). However, there are also volatile solids that are retained in the system from month to month.

In addition, the methane conversion factors referenced in Appendix B, Table 5 are from IPCC 2006 and represent a factor used to calculate an annual estimate of methane emissions. These MCFs were calculated assuming a retention time of one year for lagoons systems, and one month for other liquid-slurry systems. Therefore, these MCFs will produce an estimate of annual methane emissions for lagoons, but will not represent the methane produced in any given month. Monthly estimates should be calculated based on the biological performance of the manure management system, as predicted by the van't Hoff-Arrhenius equation (factor "f") using system-specific data on temperature and retention time.

The CCAR protocol should either (1) only require an annual calculation of emissions (accounting for monthly changes in livestock waste production) or (2) change the monthly calculation to include volatile solids retention and directly calculate the methane emissions through use of the van't Hoff-Arrhenius equation, instead of using annual or "monthly" MCFs. Reporting of monthly emissions using the current calculation does not increase accuracy and in fact would result in an inaccurate picture of the seasonal variation of methane emissions.

We recommend option (1) and suggest that CCAR could offer an annual livestock characterization worksheet to facilitate correct accounting of volatile solids by system type. Project developers would then estimate the volatile solids per year to each system type and do one annual calculation for baseline and project emissions.

A4. Metered biogas pressure and temperature correction (AgCert, CFBF, CARES, EPT Corp , WUD)
We agree the Protocol should require pressure and temperature correction of the metered biogas, but suggest that CCAR not specify continuous monitoring of temperature and pressure as part of flow meter requirements (i.e. the CH4 gas combustion parameter "tCH4" in the Section VI monitoring table (p. 23). As a note, most biogas flow meters that will be used automatically and continuously correct for temperature and pressure.

A5. Project boundaries include year one construction emissions (AgCert, CFBF, CARES, SMUD, WUD)
It should be noted that the Registry's Draft Protocol includes GHG emissions from project construction, unlike other existing protocols, including the ERT Protocol, the RGGI Model Rule, and the CDM Methodology ACM0010. We note, however, that *The Greenhouse Gas Protocol*, by the World Business Council for Sustainable Development and the World Resources Institute that says that one-time effects (such as construction) should be considered a secondary impact/effect. The Registry's approach will result in a reduction of GHG emission reduction credits for the dairies. If it retains this approach, comparison to other protocols and more justification in the text should be included.

A6. Construction Emissions (WRI)
Table 1 does not appear to include one-time effects related to construction emissions. Recommend including these in the Table, as a separate GHG source category. We

recommend also clarifying what emissions should be accounted for related to construction, since there currently does not appear to be guidance for this in the protocol.

A7. Site-specific data (AgCert, CFBF, CARES, WUD, ERG, ERT)
There are several methods to estimate baseline and project emissions, which are outlined in great detail in U.S. Department of Energy's (USDOE) Technical Guidelines for Voluntary Reporting of Greenhouse Gas Program16, including direct measurement, process models (nitrogen and carbon cycle models that estimate ecosystem processes), inference (input data multiplied by State, regional, or national emissions/sequestration factors), and hybrid estimation approaches (a mix of direct measurement or process models with the inference approach). The proposed calculation method in the Draft Protocol appears to be primarily by inference, with one hybrid element consisting of direct measurement of CH4 concentration and biogas flow rate to the biogas control system. However, there are numerous other factors that can be measured at a dairy to help quantify GHG emissions, including the VS rate entering and exiting the anaerobic digester. This rate can be determined by collecting water samples and the site-specific analytical results provide a more accurate volatile solid excretion rate to help calculate the project emissions. It is unclear from the Draft Protocol whether direct measurements can and should be accounted for in the baseline and project emission equations provided. There may be other equations that would be better suited to expressing site-specific GHG emissions based on direct measurements and this possibility should be explored and addressed by the Registry. At the very least, the option to use site-specific data should be discussed and procedures for their approved use are included in the Protocol.

A8. Methane conversion conservativeness factor (EcoSecurities, ERG, ERT
The use of a methane conversion conservativeness factor is brought in to address the uncertainty associated with using a "default" methane conversion factor, specifically the 20% uncertainty in the methane emissions factors (which are a combination of Bo and MCF values), as reported by IPCC 2006. Ideally, the MCF used for the baseline analysis would be based on site-specific factors, such as volatile solids generation, a Bo based on the type diet used at the site, and an MCF that reflects the temperature and retention time of the baseline system. Using this type of site-specific data in the monthly calculation can greatly reduce the uncertainty associated with a specific operation's emissions estimates.

If the use of a methane conversion conservativeness factor is retained, it is incorrectly applied to Equation 4b. For project emissions, to be conservative, the factor should be greater than one (e.g., 1.06).

The inclusion of this "conservativeness" factor is not appropriate. MCF values used in the IPCC are based on research performed by Mangino et al. (2001) in association with the US EPA, and their results characterized MCFs for farm operations in the US. The application of a "conservativeness factor" in IPCC was intended to account for the error associated with applying US factors to developing country farming operations. Because this methodology will be used for US based manure management projects, the default IPCC MCFs are applicable without any "conservativeness factors".

A9. Baseline GHG emissions for new facilities (AgCert, CFBF, CARES, WUD, ERG, ERT)
The temporal range is not clearly defined in the Draft Protocol. It is our understanding that CCAR intends to include new facilities in the temporal range. However, it should be noted that Section III of the Draft Protocol states that existing U.S. farms are eligible as GHG reduction projects under the Location criteria and makes no mention of new facilities. The Draft Protocol

should specifically address whether new facilities are eligible for GHG emission reduction credits and, if so, what approach they should use to determine their baseline GHG emissions.

A10. Types of GHG emissions from various manure management systems (AgCert, CFBF, CARES, WUD)
Table 1 of the Draft Protocol lists the GHG sources within the project boundary and the main type of GHG (CH4, N2O, or CO2) those sources generate. The manure settling basins and aerobic lagoons should be updated to indicate that these sources also generate N2O. In addition, the CDM Methodology ACM0010 addresses baseline and project CH4 emissions from leakage (i.e. land application of treated manure). Since manure "disposal," including land application is considered part of the Draft Protocol's project boundaries, Table 1 should be amended to include CH4 emissions from land application, and this source of CH4 emissions should be included in the baseline and project emission calculations.

A11. GHG reduction calculations (AgCert, CFBF, CARES, WUD)
The Draft Protocol asserts that the GHG baseline and project emission reductions will be calculated on a monthly basis, but summed annually. The reasons for this approach, which is different from other emission reduction protocols, including the CDM Methodology ACM0010, are unknown. Furthermore, the Draft Protocol is not consistent with their stated approach with the equations provided: for example, Equation 2b (Baseline methane emissions for non-dominant livestock categories) calculates CH4 emissions in tons of CH4 per month, whereas Equation 3 (Baseline carbon dioxide emissions) calculates CO2 emissions in tons of CO2 per year.

A12. Lagoon construction (AgCert, CFBF, CARES, WUD)
The second paragraph on page 2 of the Registry's *Manure Management Certification Protocol* (Certification Protocol) indicates that the biogas capture system should "prevent manure waste from leaking into the groundwater by constructing a non-permeable layer at the lagoon bottom and dispose of manure waste in a manner that does not contaminate natural water resources." This statement should be removed since this involves water quality regulations, not GHG considerations. (We are assuming that CCAR is not implying that groundwater from "lagoons" results in GHG emissions or GHG leakage.) Any biogas capture system (or any lagoon or storage pond) would be subject to all applicable air and water quality regulations.

A13. Reporting for projects that have a start date before 2005 (Blue Source)
It seems that technically the deadlines for registering 2001 – 2005 reductions have elapsed although, according to the draft protocol, the project VER's for these projects will be eligible for a 10 year period. Clarification on this point is much appreciated and, again, keep up the great work.

A14. Dynamic baseline (USDA-NRCS)
Why ask a participant to tabulate a dynamic baseline (page 11)? There is no data to verify what would occur in the absence of the biogas control system, farm modifications, etc.

A15. Allowance of registered reductions (USDA-NRCS, CRPE)
I do not necessarily agree with the allowance of registering reductions for the lifetime of the project even if the performance standard test or regulatory test changes (page 4). What happens if there is an error or a more accurate method to register reductions discovered midway through the 10-year project-crediting period?

A16. Compliance with local, state and national air and water quality regulations (SMUD, EPT Corp)
It is recommended that CCAR not make it an annual requirement for a project developer to "demonstrate that the project meets local air and water quality regulations". A document from the local air district, water district, and building department be provided at the beginning of the project only. Local, state and federal regulators are obligated to monitor projects and enforce regulations and shut down a digester if it is out of compliance, thus terminating the greenhouse gas reductions. Project developers should not assume the responsibility of a regulator. Annual review of all of the complex and changing regulations would place undue burden and expense on the project developer.

A17. Example of Representative Farm (CARB, ERG, ERT)
It would be good to mention the different types of digesters addressed by this protocol earlier on (best if in the introduction). In addition, if possible, it would be good to have some pictures or diagrams of typical digesters. *More importantly*, it would be good to provide a full, start-to-finish example which describes a "representative" farm and shows how that farm calculates its emissions using real or representative data, tables, equations, etc.

We recommend that CCAR use the definitions included in the EPA's U.S. Inventory of Greenhouse Gas Emissions and Sinks: 1990-2005 (April 2007, USEPA #430-R-07-002), listed in Table A-165 of Annex 3, listed below.

- **Liquid/ Slurry.** Manure is stored as excreted or with some minimal addition of water to facilitate handling and is stored in either tanks or earthen ponds, usually for periods less than one year.

- **Anaerobic Lagoon.** Uncovered anaerobic lagoons are designed and operated to combine waste stabilization and storage. Lagoon supernatant is usually used to remove manure from the associated confinement facilities to the lagoon. Anaerobic lagoons are designed with varying lengths of storage (up to a year or greater), depending on the climate region, the volatile solids loading rate, and other operational factors. Anaerobic lagoons accumulate sludge over time, diminishing treatment capacity. Lagoons must be cleaned out once every 5 to 15 years, and the sludge is typically applied to agricultural lands. The water from the lagoon may be recycled as flush water or used to irrigate and fertilize fields. Lagoons are sometimes used in combination with a solids separator, typically for dairy waste. Solids separators help control the buildup of nondegradable material such as straw or other bedding materials.

In addition, the protocol could reference standard design documents, such as USDA's Conservation Practice No. 359 (Waste Treatment Lagoon) and No. 313 (Waste Storage Facility).

A18. Protocol only addresses dairy and swine (CARB)
You don't have volatile solids data from other animals like poultry or sheep so you should make it clear that this protocol only addresses dairy & swine.

A19. Continuous CH4 monitoring (AgCert, CFBF, CARES, SMUD, WUD)
The need for constant monitoring of biogas constituents is expensive. Quarterly or monthly measurements would be more cost effective and would provide adequate accuracy.

A20. The project developer (AgCert, ERG, ERT, WRI)
Project developers may encompass other entities than only livestock owners and operators, such as third-party aggregators. Ownership eligibility of the GHG reductions should be established by clear and explicit title, and does not have to be constrained to the livestock owners and operations.

A21. Performance standard test (WRI)
The summary analysis presented in Appendix C suggests that a technology-specific threshold (installation of an anaerobic digester) for determining additionality may be reasonable. That being said, it is not clear from the summary whether the study asked the appropriate questions for substantiating this threshold. According to the data, only a very small percentage of dairy/swine farms in California and the U.S. have installed anaerobic digesters. It does not follow, however, that most (or any) new anaerobic digester installations are therefore likely to be additional. The question for setting an additionality threshold is one of conditional probability: given that an anaerobic digester is being installed (always the case if a project is applying for eligibility), what is the probability that it is additional? To fully answer this question requires understanding something about the existing installations, notwithstanding their rarity. Were they installed under exceptional conditions? For demonstration purposes? With subsidies? Due to local ordinances? How many of them receive revenue from using captured methane to generate energy or electricity? What are energy prices like where these projects are located?

Answers to these questions might indicate criteria for screening out which digester projects are likely to be additional, versus those that are "business as usual" according to the current set of economic and other factors that drive these projects. Of course, the result of this kind of analysis might lead to the same conclusion, i.e., on balance, any new digester project is likely to be additional. This could be the case, for example, if only very few new projects are likely to face the same conditions as existing ones (or if there are no identifiable commonalities among existing projects). But the current study does not appear to have asked these questions, at least as summarized in Appendix C. Our recommendation would be to bolster the analysis with their explicit consideration

A22. Project Boundary (WRI)
This is a terminology question, which is always somewhat subjective, but we recommend using the term "GHG Assessment Boundary" instead of "Project Boundary" to make clear that the boundary encompasses more than just the on-site and intended consequences of the project

A23. Secondary impacts (WRI)
We recommend mentioning that secondary impacts can include one-time effects, as well as ongoing (upstream and downstream) effects, since one-time effects related to construction emissions are referred to in footnote 3 and later in the protocol. Also, under the GHG Protocol, only "significant" secondary must be accounted for. This distinction may deserve mention, since otherwise it may not be clear precisely which GHG sources should be considered. Presumably, every category listed in Table 1 is significant and must be accounted for, but the protocol states that the table is only illustrative. We recommend clarifying what is required.

A24. Annual calculation of baseline emissions (WRI)
In GHG Protocol terminology, a "current practice" baseline scenario would be a baseline scenario involving the "continuation of current activities." We recommend referring to the GHG Protocol terminology in a footnote. Also, we recommend clarifying the statement that, "Additionally, project developers calculate baseline emissions each year of the project."

Specifically, we presume this means that estimates of "current practice" baseline emissions are adjusted to reflect current year conditions.

A25. Mobile and stationary combustion sources (WRI)
Although possible GHG sources are noted in Table 1, it would be helpful to include mention of specific types of typical mobile and stationary combustion sources that should be included in the calculations. Furthermore, we recommend clarifying whether any of these sources may be ignored where they are insignificant or immaterial. Alternatively, we recommend explicitly requiring reporting on all GHG sources listed in Table 1 and clarifying how these sources should be quantified (e.g., with respect to vehicle-miles attributable to the project).

A26. Baseline carbon dioxide emissions (ERG, ERT)
The protocol states that mobile and stationary source emissions need to be included in the baseline. Please clarify if these emissions need to be included even when no change is being made that would increase or decrease emissions from baseline to post-project emissions. In other words, do all mobile and stationary sources need to be quantified for baseline if the biogas control project does not affect them? In these cases, it should be sufficient to describe the baseline and project operations and conclude what sources need to be quantified.

A27. The protocol should include all calculation and reporting procedures to be used in the document itself and should not reference procedures located in other protocol documents, such as the ACM 0010. (ERG, ERT)
There is no assurance of whether changes will be made to other protocols in the future, and whether such changes will be consistent with CCAR's intended approach. Therefore, all procedures to be used should be located in the CCAR protocol directly.

A28. Issue with "most biogas control systems … anaerobic ponds and lagoons" (ERG, ERT, Hall)
Footnote 1 should be deleted as it is confusing and inaccurate to say that most biogas control systems collect and combust biogas from anaerobic ponds and lagoons. The footnote implies that most digesters are covered lagoons, when in fact of the 80 operating digesters in AgSTAR's records, only 19 are covered lagoons.

A29. Land application of manure (ERG, ERT)
You might consider altering the terminology used for Box 3 in Figure 1. On- and off-site land application of manure and bedding is not considered "waste disposal" when used to supply nutrients for crop growth. In addition, the figure does not clearly depict where the project boundary is in relation to the biogas combustion device, if one is in use.

A30. Primary and Secondary Impacts (ERG, ERT)
There does not seem to be a utility to differentiating between primary and secondary impacts, as both are to be included in the evaluation of GHG emissions and reductions.

A31. Design and maintenance of anaerobic lagoons (ERG, ERT)
Footnote 13 elaborates on how project developers would demonstrate that their baseline anaerobic ponds/lagoons were in fact operating as anaerobic systems. The footnote references consistency with ACM0010, and focuses on the depth of the system being sufficient to create an oxygen-free bottom layer. However, it misses a key point: the anaerobic treatment zone is not established by a particular depth, but by ensuring the lagoon was designed with sufficient volume for the volatile solids loading to the lagoon. U.S. systems should be required to show the design records for their systems, to ensure that they are in fact anaerobic lagoon systems,

as well as the operating records to show that they retained sufficient volume in the system to allow anaerobic treatment conditions to be present (and that solids build up did not impact this treatment zone). We refer CCAR to USDA NRCS' conservation practice for Waste Treatment Lagoons (Conservation Practice 359).

A32. Table C.2, Dairy and Swine Operations in the US by Manure management System (ERG, ERT)
This table should be referenced to the Climate Leaders protocol (Table I.A. of Appendix I), not the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004 (as that does not cover operations in 2006).

A33. Demonstrate no increase in electrical load (CARB)
I think it's important to include whole farm energy use (in btu or kwh) before & after project implementation to make sure that the digester is not increasing load on the grid

A34. Associated Environmental Impacts (CARB)
It would be good to include a link or reference to approved methods for monitoring emissions such as NOx from a combustion generator device.

[Response: The Registry has chosen to refer project developers to their local regulatory agencies for guidance in this regard based upon other comments received through the public review process.]

A35. Certification Protocol (EPT Corp)
The twenty-three item check list is mostly judgment calls that will only be reviewed when there is a subsequent problem on the dairy with a regulator. This Certification Protocol will then be called upon. This requirement is more specific and pointed than a certified audit for a small public company, which EPTC is. All this does is require more time than is necessary and runs the hours required for certification into an expensive activity. Who is going to pay the four to five thousand dollars it will cost to complete the annual requirements imposed by the Registry?

A36. Table 1, Manure Management Source Categories, GHG Sources, Main Associated Gas, and Coverage in the Manure Management Project Boundary. (ERG, ERT)
Listed below are several suggestions for Table 1 to improve terminology or clarify coverage.

- Under Waste Production, please also list milk centers as a location where manure is deposited.
- Enteric fermentation is listed as not included in the project boundary since there is "no change due to project". This is not necessarily a correct statement. For example, if the operation changes its feeding strategy to maximize biogas production from the digester, there may be a corresponding change in enteric fermentation emissions from ruminant animals. If enteric emissions increase, but are not considered in the protocol, the resulting greenhouse gas reductions will be overestimated.
- For manure settling basins, list nitrous oxide as a secondary impact (similar to storage ponds).
- The table appears to be missing indirect nitrous oxide emissions, which can be significant for systems generating large ammonia emissions.
- Under Waste Collection and Transport, the table indicates that all engines and pumps for flush systems and vacuums and tractors for scrape systems need to be included as secondary impacts. However, would a project developer need to estimate emissions

from all these pieces of equipment if there is no change in their operation from baseline to post-project?

[Response: The Registry acknowledged and incorporated most of the recommendations in A36.]

A37. Thorough and a relatively easy document to read (USDA-NRCS)
Unexpectedly I found the MMPRP to be thorough and a relatively easy document to read which should be an incentive to those farmers or project managers interested in a venture of this sort but unfamiliar with the lingo. This comment is based on comparisons to similar registry documents for the 1605b program.

A38. No USDA sources cited in the reference section (USDA-NRCS)
I noticed there were no USDA sources cited in the reference section (page 30). Although I am certain individuals with an ag background were involved with the Protocol and I can not immediately think of a USDA literature source that may have been useful for the protocol development, I find it odd that data from USDA or another agricultural group is not cited.

[Response: Agree, no citations an oversight. Have updated to do include appropriate USDA docs.]

A39. Consistency with the WRI/WBCSD GHG Protocol for Project Accounting (WRI)
The basic structure of the Protocol is substantively consistent with the WRI/WBCSD GHG Protocol for Project Accounting.

A40. Concern over development of multiple livestock waste management protocols (Hall)
I am concerned about the development of multiple protocols for tracking greenhouse gas emission reductions associated with livestock waste management. While all of these protocols are similar in many respects, they also do contain significant differences. It is my view that a single national protocol is needed. Thus, I recommend that a group with representatives from all interested parties be assembled to resolve differences among the various protocols; EPA Climate Leaders, RGGI, *etc*.; and agree on one national protocol.

[Response: The goal of the Registry has been to incorporate much of the valuable material that has been developed by other regional, national and international organizations into this project protocol as possible.]

A41. Review by panel of experts (Hall)
I recommend that the proposed protocol be subjected to a review by a panel of experts and professionally edited before being finalized.

[Response: Prior to the public review process, the protocol was subjected to a work group review process which involved industry experts. The Registry has determined that the work group review coupled with the public review process, during which comments from over 15 professional organizations and agencies were incorporated is sufficient for the first draft of the protocol.]

A42. Exclusion of credit associated with electricity generated using biogas (Hall)
The logic underlying the treatment of secondary carbon dioxide impacts associated with the use of captured methane to generate electricity is not clear. It does not appear logical to provide

credit for carbon dioxide emission reductions associated with the generation of electricity used on-site while not providing credit under the same protocol for reductions associated with the generation of electricity delivered to the grid. Both potentially reduce fossil fuel use to generate electricity and the associated carbon dioxide emissions. Furthermore, most biogas projects that generate electricity will use some of the electricity generated on-site and deliver the surplus to the grid. Thus, represents an added, but apparently unnecessary, degree of complexity to the protocol. If there is a rational explanation for this approach, it should be presented in the protocol.

[Response: The emission reductions credits associated with the displacement of indirect emissions for electricity consumption were de-coupled from this protocol because there are numerous compensation mechanisms at the disposal of the developer aside from greenhouse gas reduction credits. A couple of these options are Renewable Energy Credits (RECs) and sale to California utility for inclusion in their Renewable Portfolio Standard. The Registry may develop a renewable energy project protocol in the future.]

A43. Potential regulations requiring biogas digester installation (CRPE)
CRPE noted that ongoing litigation involving the San Joaquin Valley Unified Air Pollution Control District may influence the application of the Regulatory Test outlined in the protocol.

[Response: Per the performance standard approach used by the Registry, the protocol is applicable in all regions across the United States. The Registry recognizes that in some locals, regulatory requirements will preclude the development of projects per the protocol. Developers are required to demonstrate that no regulatory requirements exist in the proposed region as a part of the project verification process, prior to the development of the project.]

A44. Registration of reductions (CRPE)
The protocol is unclear on how reductions will be registered. The protocol should clearly articulate the verification and registration approach to provide as transparent a process as possible.

A45. Incentives only for combustion of biogas (CRPE)
The protocol creates incentives only for the deployment of biogas control systems designed to capture and combust greenhouse gases. This may dissuade livestock operators from implementing biogas control systems that do not require combustion to control greenhouse gases. The protocol should ensure that disincentives are not created for the employment of non-combustion technologies.

A46. Exclusion of carbon dioxide emissions from biogas control systems assessment (CRPE)
This approach appears to overlook the fact that the carbon dioxide emissions would not exist in the first place if it were not for the livestock operation. To capture the most accurate estimation of emission reductions, the protocol should require the subtraction of any and all carbon dioxide an nitrous oxide emission reductions prior to registering reductions because non of the emissions would exist without the livestock operation in the first place.

A47. Risk based discounting mechanism (Mid American)
Mid American recommends a risk based discounting approach, similar to the Chicago Climate Exchange's 18.25 carbon dioxide equivalent credits perr unit of methane destroyed, be taken to provide a universal project offset credit based on the destruction of methane.

A48. Global Warming Potential (Mid American)
The most up to date global warming potential (GWP) multiplier should be utilized. The Fourth Assessment Report of the IPCC will be out soon. It is suggested that the GWP from this report be utilized for new project calculations.

[Response: For consistency with the California Air Resources Board, the U.S. Inventory and the predominant approach in the international community the Registry is requiring the use of the Second Assessment Report GWPs at this time.]

B. COMMENTS SPECIFIC TO THE CALCULATION METHODOLOGIES

B1. Equation 2a, VS_{dl} (EcoSecurities, Hall)
IPCC default VS excretion rates should be applicable for dominant livestock types similarly as directed for non-dominant livestock types.

To generate VS excretion rates as directed in Equation 2a would be both difficult to generate initially and difficult to monitor on a site specific basis. For example, the digestibility of food (DE_{dl}) will vary with animal weight and genetic make up.

Analysis of the individual terms where not presently available will involve difficult and expensive analysis and will take substantial time. Over all, IPCC defaults accurately characterize the VS production rate. Should be based on IPCC defaults selected by animal genetic type and scaled by on-site average weight (as done in ACM0010).

> [**RESPONSE**: The objective of classifying a "dominant" livestock category is to maximize the use of site-specific data to determine the available VS that is converted to methane in the anaerobic storage ponds and treatment lagoons. The document has been updated to state that the Registry will work with project developers to reasonably apply "dominant" the classification.]

The daily volatile solids excretion rate is incorrectly expressed in kg dry matter per day. It should be kg volatile solids per day. Dry matter and volatile solids should not be used interchangeably as they differ technically.

> [**RESPONSE**: The "B_0" value is expressed in m^3/kg VS on a dry matter weight basis; thus the VS value needs to be in kg dry matter, too; See ACM0010]

B2. Post digester treatment of wastewater (EcoSecurities)
There is the possibility that some projects will install post digester treatment of wastewater (for example aeration), in this case the VS of the wastewater would be further degraded reducing or eliminating the potential for CH_4 emissions from effluent ponds.

> [**RESPONSE**: The protocol allows for the effluent pond to be an aerated system. Thus its MCF value will be 0%.]

B3. Choice of MCF (EcoSecurities)
The choice of MCF should be relative to type of wastewater treatment that is used to sequentially treat digester effluent. IPCC defaults for various wastewater treatment types are used in a similar fashion in AMS III.H.

Similarly, this type of "sequential treatment step" accounting for degraded VS is done in ACM0010 using equation 10.b. If the characterization of project emissions for alternative treatment steps were allowed, it would provide incentive to undertake further treatment, and would be a more accurate way to account for such treatment.

[**RESPONSE**: Agreed. The protocol does not preclude project developers from undertaking further treatment of wastewater.]

B4. Equations 2, 2a, 2b (ERG, ERT, Hall)

Throughout these equations, the term "s" is defined as a methane source. It would be clearer to refer to these sources as system types. There may be other methane sources present (such as enteric fermentation or uncombusted biogas) that are not appropriately considered using these equations. The equations as presented are only applicable for manure management system emissions.

[**RESPONSE**: Agreed. Change made.]

In addition, these equations use a term "MP" which refers to the monitoring period of one month. However, the equation should use a term of how many days within the monitoring period the animals were present and contributing manure to that system type (e.g., 25 days per monitoring period, 30 days per monitoring period).

[**RESPONSE**: Agreed. Change made.]

Finally, in Equation 2b, the term "Mass" is defined as the average live weight for the non-dominant livestock category (normalized to 1,000 kg). This definition is unclear. Since the VS rate being used is kg VS/day/1,000 kg of animal, the equation should include the Mass divided by 1,000, rather than asking users to normalize the weight to 1,000 kg. IN addition, it should be made clear that the mass should represent the average live weight for the livestock category during the reporting period.

[**RESPONSE**: Agreed. Change made.]

B5. Equation 4b, MCF (ERG, ERT)

Equation 4b estimates emissions from a biogas control system effluent pond. The MCF is referenced to Appendix B, Table 5. However, on page 25 of the protocol, the parameter MCF_{ep} is listed with comments to use the uncovered anaerobic lagoon MCF value. This direction has no supporting discussion as to why one would use an anaerobic lagoon MCF for a pond that could have significantly lower volatile solids loading following digestion, and may have been designed to hold a much larger volume prior to the project installation. (It is not unusual for an operation to install a digester, and convert an existing pond or lagoon to be an effluent storage pond.) These storage ponds are not designed to encourage anaerobic treatment of the remaining volatile solids in the effluent. It would be more appropriate to use an MCF for a liquid/slurry system, which is more reflective of short retention time or lower load systems.

B6. Parameter MS (ERG, ERT)

The fraction of manure from each livestock category managed in each manure management system type (MS), is monitored on an annual frequency. However, if you are requiring monthly monitoring of livestock category populations, it would be reasonable to also track the location where animals are housed that month (e.g., hours per day in milk center, hours per day on drylot).

[**RESPONSE**: The objective of the MS value is to assign a percentage to where the waste goes in terms of a GHG emitting source. It is not important to assess where the waste was originally deposited, except if where the manure is deposited is where it remains and is converted to methane.]

B7. Project methane calculation variables – biogas control system + effluent pond (CARB, ERG, ERT)

For post-project emissions, the CCAR protocol lists a parameter for VS in the evaporation pond. VS of the digester solids should also be tracked, as these solids may be stored on site, or transferred for land application or other uses.

[**RESPONSE**: Agree. Document updated.]

Parameter VS_{ep}, if measured by EPA Method 160.4, will return a concentration result (mg/L). This result needs to be used in combination with a flow or volume measurement of the evaporation pond to calculate mass of volatile solids present.

[**RESPONSE**: Agreed. Change made.]

Parameter Bo_{ep} is confusing, especially if multiple livestock categories have contributed waste to the digester. It is also not clear if this Bo value would correctly represent the volatile solids remaining in the digester effluent (which is expected to be quite small).

[**RESPONSE**: Agreed. Change made.]

Parameter MCF_{ep} was discussed earlier as to why an uncovered anaerobic lagoon MCF would not be appropriate for an effluent storage pond. The designation of whether a system is better classified as an anaerobic lagoon versus a pond or liquid/slurry system should be based on the specific design of the system. Regarding frequency, shouldn't this be monthly?

[**RESPONSE**: Agreed. Change made.]

Parameter BDE - Why is this monthly when BCE is annually? Seems like an illogical discrepancy.

[**RESPONSE**: Agreed. Change made.]

B8. Modifying PE_{ep} (AgCert, CFBF, CARES, WUD)

We would like to request that the equation for project emissions from the effluent pond (PE_{ep}) be modified to avoid potential over-estimation of effluent emissions from dairy farm digester systems.

[**RESPONSE**: Agreed. Change made.]

B9. Equation 4a, the "-1" (CARB)

I don't believe that this equation should have the -1 after the 1/BCExBDE

[**RESPONSE**: The equation is correct.]

B10. Equation 4c, "normalized to 1000kg (CARB)

You need to explain what you mean by the phrase "normalized to 1000kg"

[**RESPONSE**: The normalization of animal weight has been embedded in the equation so no explanation is required.]

B11. General project parameters (ERG, ERT)
Parameter L, livestock categories, is monitored on an annual frequency, while parameter P_l is monitored on a monthly frequency. They both should be monitored on the same frequency (monthly). Also, livestock categories are referenced to Appendix B, Table 1, when they are in fact listed in Table B.2.

[**RESPONSE**: Agreed. Change made.]

Manure management system components are referenced to Appendix B, Table 2, when they are in fact listed in Table B.1. In addition, we recommend renaming these from "methane sources" to "system types".

[**RESPONSE**: Agreed. Change made.]

B12. Equation 4a and elsewhere, BCE and BDE (Hall)
In Equation 4a and elsewhere, BCE and BDE should be decimal values.

[**RESPONSE**: Agreed. Change made.]

B13. Equation 4b, B_o (Hall)
It is incorrect to used B_o in Equation 4b. B_0 is the maximum methane producing capacity per kg of volatile solids as excreted. It is not applicable to digester effluent volatile solids. This parameter will be variable depending on the degree of conversion of volatile solids to biogas occurring in a digester, which will be a function primarily of hydraulic retention time and temperature.

[**RESPONSE**: Agree that this is an imperfect application of B_0, thus the Registry has made a provision to allow project developers to provide justified alternative value.]