AUTHENTICATED U.S. GOVERNMENT INFORMATION GPO

Federal Register

Monday,
January 31, 2005

Part IV

Environmental Protection Agency

Animal Feeding Operations Consent Agreement and Final Order; Notice

ENVIRONMENTAL PROTECTION AGENCY

[OAR–2004–0237; FRL–7864–4]

Animal Feeding Operations Consent Agreement and Final Order

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of consent agreement and final order, and request for public comment.

SUMMARY: The EPA is offering animal feeding operations (AFOs) an opportunity to sign a voluntary consent agreement and final order (henceforth referred to as the ''Air Compliance Agreement'' or the ''Agreement''). A copy of the Air Compliance Agreement is attached as an Appendix to this notice. The sign-up period for eligible AFOs to sign the Agreement will run for 90 days from the date of this notice.

AFOs that choose to sign the Air Compliance Agreement will share responsibility for funding an extensive, nationwide emissions monitoring study. The monitoring study will lead to the development of methodologies for estimating emissions from AFOs and will help AFOs to determine and comply with their regulatory responsibilities under the Clean Air Act (CAA); the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); and the Emergency Planning and Community Right-To-Know Act (EPCRA). Once applicable emission estimating methodologies have been published by EPA, the Agreement will also require each participating AFO to certify that it is in compliance with all relevant requirements of the CAA, CERCLA and EPCRA.

EPA is requesting comment on the Air Compliance Agreement, with particular emphasis on implementation of the Agreement. All comments should be submitted within 30 days of the date of this notice.

DATES: Comments must be received on or before March 2, 2005.

ADDRESSES: Submit your comments, identified by Docket ID No. OAR–2004–0237, by one of the following methods:

- Agency Web site: *http://www.epa.gov/edocket*. EDOCKET, EPA's electronic public docket and comment system, is EPA's preferred method for receiving comments. Follow the on-line instructions for submitting comments.
- E-mail: *a-and-r-docket@epa.gov.*
- Fax: (202) 566–1741.
- Mail: Air Docket, Environmental Protection Agency, Mailcode: 6102T, 1200 Pennsylvania Ave., NW., Washington, DC 20460. Please include a total of two copies.
- Hand Delivery: Environmental Protection Agency, 1301 Constitution Avenue, NW., Room B102, Washington, DC 20460. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. OAR–2004–0237. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *http://www.epa.gov/edocket,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through EDOCKET, regulations.gov, or e-mail. The EPA EDOCKET and the Federal regulations.gov Web sites are ''anonymous access'' systems, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through EDOCKET or regulations.gov, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Docket: All documents in the docket are listed in the EDOCKET index at *http://www.epa.gov/edocket.* Although listed in the index, some information is not publicly available, *i.e.,* CBI or other information whose disclosure is restricted by statute. Certain other information, such as copyrighted materials, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in EDOCKET or in hard copy form at Docket ID No. OAR–2004–0237, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: For information on the Air Compliance Agreement, contact Mr. Bruce Fergusson, Special Litigation and Projects Division, Office of Enforcement and Compliance Assurance, U.S. EPA, Ariel Rios Building, Washington, DC 20460, telephone number (202) 564–1261, fax number (202) 564–0010, and electronic mail: *fergusson.bruce@epa.gov.*

For information on the monitoring study, contact Ms. Sharon Nizich, Organic Chemicals Group, Emission Standards Division, Office of Air Quality Planning and Standards, U.S. EPA, Research Triangle Park, NC 27711, telephone number (919) 541–2825, fax number (919) 541–3470, and electronic mail: *nizich.sharon@epa.gov.*

SUPPLEMENTARY INFORMATION:

Overview of the Air Compliance Agreement: By offering AFOs this opportunity to sign an Air Compliance Agreement, the Agency will help participating AFOs pool their resources to lower the cost of measuring emissions and ensure that they comply with all applicable environmental regulations in the shortest amount of time. While EPA has the authority on a case-by-case basis to require AFOs to monitor their emissions and to come into compliance with applicable Federal laws, that process has proven to be difficult and time consuming, partly due to the uncertainty regarding emissions from AFOs, which was reiterated in a recent report by the National Academy of Sciences (NAS).[1] Moreover, even when EPA has reached a successful resolution of an enforcement case, only the facilities that are the subject of the enforcement action were directly affected. Consequently, EPA believes that the Air Compliance Agreement will be the quickest and most effective way to address the current uncertainty regarding emissions from AFOs and to bring all participating AFOs into compliance with all applicable regulatory requirements.

The Air Compliance Agreement will not affect in any way EPA's ability to respond to an imminent and substantial endangerment to public health, welfare or the environment. Nor will participation in the Agreement provide protection for criminal violations of

[1] NAS, ''Air Emissions From Animal Feeding Operations: Current Knowledge, Future Needs,'' National Research Council, 2003.

environmental laws. Finally, the Air Compliance Agreement is not intended to affect compliance by AFOs with any requirements of the Clean Water Act (CWA) and the implementing regulations applicable to concentrated animal feeding operations.

AFOs that choose not to sign an Air Compliance Agreement will be subject to potential enforcement action by the Federal Government for any CAA, CERCLA, or EPCRA violations, as would any AFO that signs the Agreement but later drops out by not complying with the terms of the Agreement.

EPA recognizes that AFOs can have a negative impact on nearby residents, particularly with respect to objectionable odors and other nuisance problems that can affect their quality of life. EPA also recognizes that concerns have been raised recently regarding the possible health impacts from AFO emissions. It is important to note, however, that under existing Federal laws, EPA has an important but limited role in dealing with many of the potential impacts from AFOs. To the extent that certain pollutants from AFOs are regulated under the CAA and are emitted in quantities that exceed regulatory thresholds, EPA can and will require AFOs to comply with all applicable CAA requirements, including limiting those emissions where appropriate. However, many of the negative impacts resulting from AFOs, such as odor, are not currently regulated under Federal laws, but are addressed by State and local laws. EPA supports local and State efforts in those areas and relies on them to enforce their State and local laws for odor and nuisance problems, health code violations, and zoning challenges posed by AFOs. The Air Compliance Agreement will explicitly require participants to comply with final State nuisance orders. In addition, the Agreement will not affect the ability of States or citizens to enforce compliance with nonfederally enforceable State laws, existing or future, that are applicable to AFOs.

Sources may also emit fugitive emissions, but this notice does not address fugitive emissions. Guidance on fugitive emissions will be issued along with other appropriate guidance/and or regulations after the conclusion of the monitoring study.

Relevant Air Pollutants and Applicable Laws: AFOs emit several air pollutants, including ammonia (NH_3), hydrogen sulfide (H_2S), particulate matter (PM), and volatile organic compounds (VOC). NH_3 and H_2S are hazardous substances under CERCLA and EPCRA, and the release of these gases may need to be reported under CERCLA and EPCRA if released in sufficient quantities. H_2S, PM, and VOC are all regulated under the CAA and subject to various requirements under that statute and the implementing Federal and State rules and regulations. Emissions of these pollutants come from many different areas at AFOs, including animal housing structures (*e.g.,* barns, covered feed lots) and manure storage areas (*e.g.,* lagoons, covered manure piles). An important issue that arises under the CAA is whether emissions from different areas at AFOs should be treated as fugitive or nonfugitive. The Agency plans to issue regulations and/or guidance on this issue after the conclusion of the monitoring study.

Applicability: The Air Compliance Agreement is being offered to AFOs in the egg, broiler chicken, turkey, dairy and swine industries that meet the definition of an AFO under the CWA. The Agreement will address emissions coming from buildings or structures that house agricultural livestock, and from lagoons or similar structures that are used for storage and/or treatment of agricultural livestock waste at participating AFOs. The Air Compliance Agreement will not address AFOs that only have open-air feedlots, such as cattle feedlots. Nor will it address emissions from sources other than animal housing structures or agricultural livestock waste storage and treatment units.

Major Terms of the Air Compliance Agreement: The Air Compliance Agreement establishes specific obligations that will apply to all participating AFOs and includes limited, conditional covenants not to sue and liability releases from EPA. AFOs that choose to participate will agree to pay a civil penalty which is based on the size of the AFO. The penalty ranges from $200 to $1,000 per AFO, depending upon the number of animals at the AFO. The threshold ranges depend upon the species of animal. The total penalty is capped and ranges from $10,000 for a participant having 10 or fewer farms to $100,000 for a participant having over 200 farms. Participation in the Air Compliance Agreement and payment of a penalty will not be an admission of liability by an AFO.

In addition, participating AFOs, except for certain contract growers, will be responsible for the payment of approximately $2,500 per farm into a fund to conduct a nationwide emission monitoring study and for making their facilities available for emissions testing under the nationwide monitoring study. In general, the monitoring study, which is described more fully below and in Attachment B to the Air Compliance Agreement (included as an appendix to this notice), will undertake over a 2-year period, emissions monitoring at a representative sample of animal housing structures and manure storage and treatment units across the country. At the end of the monitoring study, EPA will use the data from the monitoring study and any other relevant, available data to develop emissions estimating methodologies. These emissions estimating methodologies will then be used by the AFO industry to estimate their annual emissions.

EPA's publication of the emissions estimating methodologies will trigger the obligation of participating AFOs to determine their emissions and to comply with all applicable CAA requirements, including applying for all required permits, and to make any requisite hazardous release notices under CERCLA and EPCRA. EPA expects to apply these emission estimating methodologies to all AFOs, whether or not they participate in the Air Compliance Agreement.

Please note that the Air Compliance Agreement does not define the scope of the term ''source'' as it relates to animal agriculture and farm activities. The Agency plans to provide guidance on this issue at the conclusion of the monitoring study.

Any AFO that fails to comply with the requirements as described will not receive the limited conditional release and covenant not to sue described later in this notice. Any conditional release and covenant not to sue offered as part of the Air Compliance Agreement will be revoked, and the AFO will remain liable for all past and ongoing violations.

AFOs that choose to participate in the Air Compliance Agreement and meet all its conditions will receive from EPA a limited release and covenant not to sue from liability for certain past and on-going CAA, CERCLA and EPCRA violations. The release and covenant not to sue will cover an AFO's liability for failing to comply with certain provisions of CERCLA, EPCRA, and the CAA up to the time the AFO reports its releases under CERCLA or EPCRA and applies for and receives the requisite CAA permits.

Participating AFOs will also be obligated to comply with all final actions and final orders issued by the State or local authority that address a nuisance arising from air emissions at the AFO. Failure to comply with the final action or order to correct the nuisance will void the conditional release and covenant not to sue offered in the Air Compliance Agreement.

Some very large AFOs will be required to immediately report estimated releases of NH_3, solely for purposes of the Air Compliance Agreement and not for purposes of reporting under CERCLA or EPCRA.

Finally, AFOs that install waste-to-energy systems that convert animal manure into electricity will get an extra 180 days to apply for CAA permits and to make the requisite hazardous release notifications under CERCLA and EPCRA.

Terms Applicable to Contract Growers and Integrators: Many AFOs, particularly in the swine, broiler chicken, and turkey industry, raise livestock for separate corporations that usually own the animals, provide feed and medical services, and that process and market the meat products. In those cases, the AFO that grows the animals is referred to as a ''contract grower,'' and the separate corporation that processes and markets the meat products is referred to as an ''integrator.''

The Air Compliance Agreement includes provisions that will allow both integrators and contract growers to participate. Among other things, a contract grower will not be responsible for the payment of monies into the monitoring fund if an integrator has already agreed to be responsible for the payment of such monies. The contract grower/integrator provisions in the Agreement will also apply to AFOs that produce milk under contract with a cooperative or that supply heifers to dairy herds owned by a separate entity.

Emissions Monitoring Study: The purpose of the monitoring study is to: collect data and aggregate it with appropriate existing emissions data; analyze the monitoring results; and create tools (*e.g.,* tables and/or emission models) that AFOs could use to determine whether they emit pollutants at levels that require them to apply for permits under the CAA or submit notifications under CERCLA or EPCRA. The monitoring study is designed to generate scientifically credible data to provide for the characterization of emissions from all major types of AFOs in all geographic areas where they are located. To provide a framework for the monitoring study and to generate a comprehensive field sampling plan from representative farms in the United States, a protocol (Attachment B to the Air Compliance Agreement, included as part of the Appendix to this notice) was developed through the collaborative efforts of industry experts, university scientists, government scientists, and other stakeholders knowledgeable in the field. Although the protocol development was facilitated by the U.S. EPA and the U.S. Department of Agriculture (USDA), it represents the opinions of the scientists, government experts, and stakeholders involved. In addition, there was extensive internal review and input by representatives from U.S. EPA's Office of Enforcement and Compliance Assurance, Office of Air and Radiation, and Office of Research and Development.

As recommended in the NAS 2003 report, ''Air Emissions From Animal Feeding Operations,'' and paraphrased here, EPA and USDA should for the short term, initiate and conduct a coordinated research program designed to produce a scientifically sound basis for measuring and estimating air emissions from AFOs. Specific recommendations being addressed with the protocol that were discussed in the NAS 2002 Interim Report [2] are related to direct measurements at sample farms by utilizing information on the relationships between air emissions and animal types, nutrient outputs, and manure handling practices; conducting studies to evaluate the extent to which ambient atmospheric concentrations of the various pollutants of interest are consistent with estimated emissions; and using scientifically sound and practical protocols for measuring pollutant concentration emission rates. EPA's longer-term strategy involves additional recommendations from the NAS which entail developing a process-based model that considers the entire animal production process. The data collected in the monitoring study will lay the groundwork for developing these more process-related emission estimates. However, as with any large and complex effort, this work must be conducted over a period of years.

Under the Air Compliance Agreement, the participating AFOs will set up an umbrella nonprofit entity (referred to here as the nonprofit organization or NPO) to handle the funds contributed by the individual participating facilities. The NPO will then subcontract to a Science Advisor and independent monitoring contractor (the ''IMC'') to run the nationwide monitoring study. The IMC will submit a proposed plan for review and approval by EPA that is consistent with the monitoring protocol outlined in Attachment B to the Air Compliance Agreement. The proposed plan would also include a list of recommended candidate facilities to be monitored.

EPA will review and approve or disapprove the proposed plan within 30 days of receiving it from the IMC. If the proposed plan is disapproved, EPA will specifically state why the plan is being disapproved and what changes need to be made. The IMC will then have 30 days to modify the proposed plan to address the changes required by EPA and to submit the modified plan to EPA for review and approval. Once the plan is approved, all participating AFOs, through the NPO, will be obligated to fully fund the nationwide emission monitoring study and to establish a binding contract with the IMC to carry out the approved plan.

Monitoring will be conducted pursuant to EPA protocols and be done by a fleet of mobile labs purchased by the NPO and overseen by the IMC hired to run the study. Emissions at the facilities will be monitored at both buildings and waste lagoons and will include H_2S, VOC, PM and NH_3. Monitoring will occur at facilities across the country to get a representative sample of the facility types in major geographic regions. EPA expects that the monitoring will begin in 2005 and continue for 2 years. Two years of monitoring is the minimum time needed because emissions from AFOs can vary greatly over the course of a year and may vary significantly from year to year. The data generated during the monitoring study will be made fully available to the general public.

Technical experts on emissions monitoring at EPA and from a number of universities believe that monitoring the farms described in the attached protocol will provide sufficient data to get a valid sample that is representative of the vast majority of the participating AFOs. Significantly increasing the number of farms to be monitored would be prohibitively expensive and would not add substantially to the value of the data collected.

Throughout the course of the monitoring study, EPA will review and analyze the data as they are generated. EPA will use the data generated from the monitoring and all other available, relevant data to develop methodologies for estimating annual emissions from swine, dairy, egg laying, broiler chicken, and turkey AFOs. Within 18 months after the conclusion of the nationwide emissions monitoring study, EPA expects that it will publish on its Web site, on a rolling basis as work is completed, the methodologies for estimating emissions for the vast majority of AFOs in the eligible animal groups.

[2] NAS, ''The Scientific Basis For Estimating Air Emissions From Animal Feeding Operations.'' Interim Report, National Research Council, 2002.

Relationship Between the Air Compliance Agreement and Other Actions the Agency May Take To Address AFO Air Emissions

In September 2001, EPA's Office of Air and Radiation (OAR) and the USDA jointly commissioned the NAS to prepare a report recommending approaches for characterizing emission profiles and identifying emission mitigation techniques, including:

- Review industry characterization and use of model farms;
- Evaluate emission factors, measurement methods, and modeling approaches;
- Recommend fate and transport methodologies;
- Identify mitigation technologies and management practices; and
- Identify critical research needs.

The NAS concluded its report in 2003 with a number of key findings, some of which are quoted here from the report:

> * * * EPA and USDA should use process-based mathematical models with mass balance constraints for nitrogen-containing compounds, methane, and hydrogen sulfide to identify, estimate, and guide management changes that decrease emissions for regulatory and management programs.
>
> * * * measurement protocols, control strategies and management techniques must be emission and scale specific * * *
>
> * * * There is a general paucity of credible scientific information on the effects of mitigation technologies on concentrations, rates, and fates of air emissions from AFOs. However, the implementation of technically and economically feasible management practices (*e.g.,* manure incorporation into soil) designed to decrease emissions should not be delayed.
>
> * * * scientifically sound and practical protocols for measuring air concentrations, emission rates, and fates are needed for the various elements (nitrogen, carbon, sulfur), compounds (*e.g.,* ammonia [NH_3], CH_4, H_2S) and particulate matter.

The EPA is planning to proceed in a manner that is consistent with the recommendations of the NAS. EPA's plan is focused on the achievement of real environmental benefits to protect public health and the environment while supporting a sustainable agricultural sector. EPA plans to continue to work with USDA and others to:

- Collect data and information related to operations at AFOs;
- Determine emissions from individual AFOs; and
- Identify appropriate regulatory and nonregulatory (*e.g.,* best management practices, environmental management systems, etc.) responses for each farm.

The Air Compliance Agreement with individual AFOs is an integral component of the data collection and emissions determinations of this effort. As discussed earlier in this notice, as part of the Air Compliance Agreement, AFOs will fund a 2-year nationwide emissions monitoring study to gather emissions data and mass balance information from AFOs. It is anticipated that emissions monitoring will be conducted at farms that represent the major animal sectors, types of operations, and different geographic locations.

The information gathered during the emissions monitoring study will be used to more adequately characterize emissions from individual farms. Individual farm emissions estimates will be used, along with other relevant information, to determine appropriate regulatory and nonregulatory responses to address the emissions. As recommended in the NAS report, EPA will then move forward to develop a process-based model which entails considering the entire animal feeding process. Similar to other large and complex efforts, the work must be conducted in stages over a period of years. The monitoring study, and the resulting emission estimating methodology, is a critical first step in this multiyear effort.

Conclusion: EPA believes that the Air Compliance Agreement will be the quickest and most effective way to address the current uncertainties regarding air emissions from AFOs and to bring the entire AFO industry into compliance with the CAA, section 103 of CERCLA, and section 304 of EPCRA. The Air Compliance Agreement's terms, conditions, and protections will be available only to those facilities that are eligible, that elect to participate, and that comply with the terms of the agreement. As appropriate, nonparticipants, and those who sign up but later drop out due to noncompliance with the Air Compliance Agreement, will be subject to enforcement actions in which significant penalties and injunctive relief could be sought for violations of the CAA, section 103 of CERCLA, and section 304 of EPCRA.

This notice describes an Air Compliance Agreement that EPA is offering certain types of AFOs and requests public comment on that Agreement. No new rights or obligations on behalf of EPA or any other party are created beyond what is contained in a fully executed and approved Agreement.

This notice provides a general description of the Air Compliance Agreement. Interested parties are encouraged to carefully read the Air Compliance Agreement and its Attachments (included as an Appendix to this notice) to fully understand what is being offered to AFOs. To the extent that provisions of the Air Compliance Agreement and its Attachments are inconsistent with this notice, the provisions of the Agreement will prevail.

Participation in the Air Compliance Agreement is voluntary. The Agreement is not intended to affect in any way EPA's ability to respond to an imminent and substantial endangerment to public health, welfare or the environment. Participation in the Agreement will not provide protection for criminal violations of environmental laws. In addition, the Agreement is not intended to affect the ability of States or citizens to enforce compliance with nonfederally enforceable State laws applicable to AFOs.

EPA recognizes that State and local agencies are undertaking efforts to improve emissions estimation methodologies for AFOs. EPA supports continued action to improve emissions information for all source categories and will use the best information available as we implement our programs. EPA also supports State and local efforts to demonstrate improved emissions reduction strategies and recognizes the value of State or local control requirements tailored to the needs of specific geographic areas. For these reasons, nothing in the Air Compliance Agreement will be used to delay or otherwise interfere with the implementation and enforcement of existing State statutes that eliminate exemptions to CAA requirements for agricultural sources of air pollution.

Request for Public Comment: As stated above, EPA is requesting comment on the Air Compliance Agreement, with particular emphasis on implementation of the Agreement. All comments should be submitted within 30 days of the date of this notice.

Earlier drafts of the Air Compliance Agreement have been circulated publicly. EPA requested and received comments on those drafts from, among others, representatives of state governments, environmental groups, local citizens' groups, and the AFO industry. Those comments were considered, and, where appropriate, changes were made to the draft agreement. In addition, the emission monitoring protocol for the nationwide emission monitoring program (Attachment B to the Agreement, included in the Appendix to this notice) was developed by a group of 30 leaders in the area of AFO air emissions, including scientists from EPA, the AFO industry, environmental groups, and several colleges and universities.

Sign Up Procedures: To participate in the Air Compliance Agreement, eligible AFOs should sign the Air Compliance Agreement and fill out Attachment A to the Agreement (the Farm and Emission Unit Information Sheets). A copy of the Agreement and all attachments can be downloaded from EPA's Web site at: *http://www.epa.gov.* The signed Agreement should be returned to EPA during the 90-day sign-up period that commences on the date of this notice. EPA will not sign the Agreement and forward it to EPA's Environmental Appeals Board for approval until after the conclusion of the public comment period.

Owners and operators of AFOs who want to sign Air Compliance Agreements with EPA will need to provide all of the following information on the Farm and Emission Unit Information Sheets for each AFO they would like to be covered by the Compliance Agreement:

- The name and address of the Respondent signing the Air Compliance Agreement;
- The name of each facility to be covered by the Agreement;
- The name of the owner and operator of each facility, including whether it is a contract grower facility;
- The location of all the covered facilities;
- The animal type and number of animals at each facility;
- The type of animal housing structure and number of structures at each facility;
- The type of manure handling system and the number of manure storage areas (*e.g.,* manure piles or lagoons) at each facility;
- The capacity and surface area, if applicable, of all manure storage areas at each facility; and,
- A description of any emission control technology or nontraditional manure treatment systems at each facility.

Signed Air Compliance Agreements, including all properly filled out attachments, should be sent to: Special Litigation and Projects Division (2248A), Attn: Air Compliance Agreements, Office of Regulatory Enforcement, Office of Enforcement and Compliance Assurance, U.S. EPA, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

At the end of the sign-up period, EPA will determine whether a sufficient number of AFOs of each species have elected to participate. The determination will be based on whether the number of participants is sufficient to fully fund the monitoring study and whether the number of participants for each type of operation is sufficient to provide a representative sample to monitor. If the total number of participants is insufficient, EPA will not sign any Air Compliance Agreements and will not proceed with the monitoring study. If, however, the total number of participants is sufficient but there are an insufficient number of AFOs with a particular species or type of operation, EPA may decline to sign Air Compliance Agreements with those particular operations and decide not to proceed with the monitoring of that type of operation. No later than 30 days after the end of the sign-up period, EPA will decide whether to proceed with all, part, or none of the monitoring study and will sign the Air Compliance Agreements and forward them to EPA's Environmental Appeals Board (EAB) for final approval.

Additional Sources of General Information: To find out more about compliance with the CAA or section 103 of CERCLA, or EPCRA 304, please access the EPA Web site at *http://www.epa.gov/air/oaq_caa.html/* or *http://www.epa.gov/superfund/action/law/cercla.htm.*

Dated: January 21, 2005.

Thomas V. Skinner,

Assistant Administrator for Enforcement.

Jeffrey R. Holmstead,

Assistant Administrator for Air and Radiation.

Appendix 1—Air Compliance Agreement With Attachments A and B; Attachment A—Farm Information Sheet; Attachment B—National Air Emissions Monitoring Study Protocol

Appendix 1

In the Matter of [Participating Company]; Consent Agreement and Final Order; CAA–HQ–2005–XX; CERCLA–HQ–2005–XX; EPCRA–HQ–2005–XX

I. Preliminary Statement

1. The United States Environmental Protection Agency (EPA) and [Participating Company] (Respondent) voluntarily enter into this Consent Agreement and Final Order (Agreement) to address emissions of air pollutants and hazardous substances from certain animal feeding operation(s) that may be subject to requirements of the Clean Air Act, the hazardous substance release notification provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the emergency notification provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA).

2. The purpose of this Agreement is to ensure that [Participating Company] complies with applicable requirements of the Clean Air Act and applicable release notification provisions of CERCLA and EPCRA. To that end, this Agreement requires [Participating Company], among other things, to be responsible for the payment of funds towards a two-year national air emissions monitoring study that will lead to the development of Emissions-Estimating Methodologies that will help animal feeding operations determine and comply with their regulatory responsibilities under the Clean Air Act, CERCLA and EPCRA.

3. This Agreement is issued pursuant to section 113 of the Clean Air Act, 42 U.S.C. 7413 (federal enforcement of the Clean Air Act); sections 103 and 109 of CERCLA, 42 U.S.C. 9603 and 9609 (federal enforcement of notification provisions); section 325 of EPCRA, 42 U.S.C. 11045 (federal enforcement of EPCRA notification provisions); and 40 CFR 22.13(b) and 22.18(b)(2) and (3) (procedural requirements for the quick resolution and settlement of matters before the filing of an administrative complaint). Respondent's participation in this Agreement is not an admission of liability. At this time, Respondent neither admits nor denies that any of its Farms is subject to CERCLA or EPCRA reporting or Clean Air Act permitting requirements, or is in violation of any provision of CERCLA, EPCRA or the Clean Air Act. The execution of this Agreement by Respondent is not an admission that any of its agricultural operations has been operated negligently or improperly, or that any such operation is or was in violation of any federal, state or local law or regulation.

4. As described more specifically in paragraphs 26 and 35 below, this Agreement resolves Respondent's civil liability for certain potential violations of the Clean Air Act, CERCLA and/or EPCRA at [Participating Company's] Farm(s) listed in Attachment A. The release and covenant not to sue found in paragraph 26 resolves only violations identified and quantified by applying the Emissions-Estimating Methodologies developed using data from the national air emissions monitoring study described herein.

5. This Agreement is one of numerous identical agreements between EPA and animal feeding operations across the nation. Through these agreements, EPA and participating animal feeding operations aim to assist in the development of improved Emissions-Estimating Methodologies for air emissions from animal feeding operations and to ensure that all animal feeding operations are in compliance with applicable Clean Air Act, CERCLA and EPCRA requirements. Notwithstanding any other provision, this Agreement shall not delay or interfere with the implementation or enforcement of State statutes that eliminate exemptions to Clean Air Act requirements for agricultural sources of air pollution.

6. EPA may decline to enter into this Agreement with animal feeding operations (and their successors and assigns) that have been notified by EPA or a State that they currently may be subject to a Federal or State Clean Air Act, CERCLA section 103 or EPCRA section 304(a) enforcement action.

II. Definitions

7. Unless otherwise defined herein, terms used in this Agreement shall have the same meaning given to those terms in the Clean

Air Act, 42 U.S.C. 7401 *et seq.*; the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9601 *et seq.*; the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11001 *et seq.*, and the implementing regulations promulgated thereunder. For purposes of this Agreement only, the following terms shall have the following meanings.

8. The term ''Agricultural Waste'' or ''Agricultural Livestock Waste'' means Livestock manure, wastewater, litter including bedding material for the disposition of manure, and egg washing or milking center waste treatment and storage. ''Agricultural Livestock'' or ''Livestock'' include dairy cattle, swine and/or poultry among others.

9. The term ''Contract Grower'' means the owner or operator of a Farm that raises Livestock or produces milk or eggs under a contract with Respondent.

10. The term ''Emissions-Estimating Methodologies'' means those procedures that will be developed by EPA, based on data from the national air emissions monitoring study and any other relevant data and information, to estimate daily and total annual emissions from individual Emission Units and/or Sources. These methodologies will be published on EPA's Web site (*http://www.epa.gov*).

11. The term ''Emission Unit'' means any part of a Farm that emits or may emit Volatile Organic Compounds (VOCs), Hydrogen Sulfide (H_2S), Ammonia (NH_3), or Particulate Matter (TSP, PM10 and PM2.5) and is either: (a) A building, enclosure, or structure that permanently or temporarily houses Agricultural Livestock; or (b) a lagoon or installation that is used for storage and/or treatment of Agricultural Waste.

12. The term ''Environmental Appeals Board'' or ''EAB'' means the permanent body with continuing functions designated by the Administrator of EPA under 40 CFR 1.25(e) whose responsibilities include approving administrative settlements commenced at EPA Headquarters.

13. The term ''Facility'' shall mean ''CERCLA Facility and/or EPCRA Facility.'' The term ''CERCLA Facility'' shall have the meaning given that term under section 101(9) of CERCLA, 42 U.S.C. 9601(9). The term ''EPCRA Facility'' shall have the meaning given that term under section 329(4) of EPCRA, 42 U.S.C. 11049(4).

14. The term ''Farm'' shall mean the production area(s) of an animal feeding operation, adjacent and under common ownership, where animals are confined, including animal lots, houses or barns; and Agricultural Waste handling and storage facilities. ''Farm'' does not include land application sites for Agricultural Waste. This definition is limited exclusively to this Agreement and establishes no precedent for the interpretation of any statute, regulation or guidance.

15. The term ''Nuisance'' is defined according to State and local common law, statutes, regulations, ordinances or usage.

16. The term ''Permitting Authority'' means the local, State or Federal government entity with jurisdiction to require compliance with the permitting requirements of the Clean Air Act.

17. The term ''Independent Monitoring Contractor'' means a person or entity that is not affiliated with Respondent or any other animal feeding operation, that has sufficient experience and expertise to fully implement the national air emissions monitoring study described herein, that meets the qualifications set forth in Attachment B to this Agreement, and that is approved by EPA.

18. The term ''Qualifying Release'' means a release that triggers a reporting requirement under section 103 of CERCLA or section 304 of EPCRA.

19. The term ''Respondent'' means [Participating Company].

20. The term ''Source'' shall have the meaning given to the term ''stationary source'' in the implementing regulations of the Clean Air Act at 40 CFR 52.21(b)(5) through (6), as interpreted by applicable guidance issued by EPA.

21. The term ''State or Local Authority'' means a state or local government entity with jurisdiction over Respondent's Farm(s).

III. Consent Agreement

22. EPA and Respondent have agreed to resolve this matter by executing this Agreement, as further set forth herein.

23. Respondent asserts that it either owns, operates or otherwise controls, or contracts with Contract Growers who own, operate or otherwise control, the Farm(s) listed in Attachment A to this Agreement. Respondent agrees that this Agreement applies only to the Farm(s) that are listed in Attachment A and contain one or more Emission Unit(s) as defined in paragraph 11 and described in Attachment A.

24. For the purpose of this proceeding, Respondent does not contest the jurisdiction of the Environmental Appeals Board.

25. As specified more fully below, Respondent consents to pay a civil penalty, to be responsible for the payment of funds to the national air emissions monitoring study, and to facilitate implementation of the monitoring study, including making certain Farms available for monitoring.

26. In consideration of Respondent's obligations under this Agreement and subject to the limitations and conditions set forth in paragraphs 27–30, 33, 34, 36, 37 and 43, EPA releases and covenants not to sue Respondent, with respect to the listed Emission Units located at the Farm(s) in Attachment A, for:

(A) Civil violations of the permitting requirements contained in Title I, Parts C and D, and Title V of the Clean Air Act, and any other federally enforceable State implementation plan (SIP) requirements for major or minor sources based on quantities, rates, or concentrations of air emissions of pollutants that will be monitored under this Agreement, namely Volatile Organic Compounds (VOCs), Hydrogen Sulfide (H_2S), Particulate Matter (TSP, PM10 and PM2.5), and Ammonia (NH_3); and

(B) civil violations of CERCLA section 103 or EPCRA section 304 from air emissions of Hydrogen Sulfide (H_2S) or Ammonia (NH_3) that are not singular unexpected or accidental releases such as those caused by an explosion, fire or other abnormal occurrence.

27. (a) The releases and covenants not to sue described in paragraphs 26 and 35 extend only to violations of the requirements identified in those paragraphs and apply only to emissions from Agricultural Waste at Emission Units (as defined in paragraph 11). They do not extend to any other requirements including but not limited to: (i) Any possible requirements that relate to emissions generated by other equipment or activities co-located at the Farm, including waste-to-energy systems; (ii) activities at open cattle feedlots for beef production; (iii) Clean Air Act permitting requirements triggered by an expansion of a Farm beyond its design capacity as of the date this Agreement is executed; or (iv) requirements that are not triggered by the quantity, concentration or rate of emission of Volatile Organic Compounds (VOCs), Hydrogen Sulfide (H_2S), Particulate Matter (TSP, PM10 and PM2.5) or Ammonia (NH_3), including work practice requirements and equipment specifications.

(b) The release and covenants not to sue in paragraphs 26 and 35 shall apply to the liability of a Contract Grower with respect to a Farm if and only if the Contract Grower executes an Agreement with EPA covering that Farm.

28. The release and covenant not to sue described in paragraph 26 covers Respondent's liability for violations with respect to an Emission Unit located at a Farm listed in Attachment A if and only if Respondent complies with all applicable requirements of this Agreement and, with respect to that Emission Unit:

(A) Within 120 days after receiving an executed copy of this Agreement, for any Farm that confines more than 10 times the ''large Concentrated Animal Feeding Operation'' threshold of an animal species,[3] the animal feeding operation provides to the National Response Center (NRC) and to the relevant local and state emergency response authorities written notice describing its location and stating substantially as follows:

This operation raises [species] and may generate routine air emissions of Ammonia in excess of the reportable quantity of 100 pounds per 24 hours. A rough estimate of those emissions is [I] pounds per 24 hours, but this estimate could be substantially above or below the actual emission rate, which is being determined through an ongoing monitoring study in cooperation with the U.S. Environmental Protection Agency. When that emission rate has been determined by this study, we will notify you of any reportable releases pursuant to CERCLA section 103 or EPCRA section 304. In the interim, further information can be obtained by contacting [insert contact information for a person in charge of the operation].

[3] This definition is being used in this Agreement solely for the purpose of determining the penalty assessed, and for certain limited reporting purposes. ''Large Concentrated Animal Feeding Operation'' is defined as: (a) 2,500 swine weighing more than 55 pounds; (b) 10,000 swine weighing less than 55 pounds; (c) 82,000 laying hens; (d) 125,000 broilers; (e) 55,000 turkeys; or (f) 700 mature dairy cows or 1000 dairy heifers.

Respondent shall provide to EPA, at the address in paragraph 64, a copy of any written notice given pursuant to this subparagraph. This interim notice shall be provided to satisfy the terms of this Agreement only and is not intended to establish a precedent or standard for reporting under CERCLA or EPCRA.

(B) Where application of the Emissions-Estimating Methodologies establishes that no Clean Air Act requirements or that no CERCLA or EPCRA notifications are required for a Source or Facility, Respondent shall so certify to EPA in writing within 60 days after EPA publishes Emissions-Estimating Methodologies applicable to the Emission Units at the Source or Facility. Any such certification shall identify each Source or Facility covered by the certification and the Emissions-Estimating Methodology used to calculate its emissions. If EPA notifies Respondent that this certification is not correct because application of the Emissions-Estimating Methodologies indicates that the Source or Facility is subject to such requirements, Respondent shall have 90 days from notification by EPA to comply with the provisions in paragraph 28(C) or submit, in writing, clear and convincing proof to EPA that Respondent's certification is correct.

(C) Respondent complies with all of the applicable requirements set forth below:

(i) Within 120 days after EPA has published Emissions-Estimating Methodologies applicable to the Emission Units at Respondent's Source, Respondent submits all Clean Air Act permit applications required by the Permitting Authority for the Source, based on application of those Emissions-Estimating Methodologies.

(a) For a Source whose emissions exceed the major source threshold in Title I, Part C or D, based on the area's attainment status (*e.g.,* in an attainment area, more than 250 tons per year of a regulated pollutant), this requirement includes:

(1) Applying for and ultimately obtaining a permit that contains a federally enforceable limitation or condition that limits the potential to emit of the Source to less than the applicable major source threshold for the area where the Source is located; or,

(2) Installing best available control technology (BACT) in an attainment area, or technology meeting the lowest achievable emission rate (LAER) if the Source is located in a nonattainment area, as determined by and in accordance with the schedule provided by the Permitting Authority for the Source, and obtaining a federally enforceable permit that incorporates an appropriate BACT or LAER limit. For the purposes of this Agreement, compliance with the requirements found in 40 CFR 52.21(k) through (p) is not a condition of the release and covenant not to sue described in paragraph 26. Nothing in this paragraph is intended to limit a state or local government's authority to impose applicable permitting requirements. Emission reductions that result from installing BACT or LAER may not be used in netting calculations to offset emissions from a future modification to the Source.

(b) The annual emissions from a particular Source shall be determined based on Respondent's current operating methods and on the maximum number of animals housed at the Source at any time over the 24 months prior to EPA's publication of the applicable Emissions-Estimating Methodologies.

(c) Respondent promptly and fully responds to any notices of deficiency (or other equivalent notification that the permit application is incomplete or incorrect) issued by the Permitting Authority with respect to the permit application(s).

(d) As described in paragraph 34, below, Farms installing waste-to-energy systems will have an additional 180 days to submit the above-referenced permit applications.

(ii) Within 120 days after EPA has published Emissions-Estimating Methodologies applicable to Emission Units at Respondent's Facility, Respondent reports all Qualifying Releases of Hydrogen Sulfide (H_2S) and Ammonia (NH_3) in accordance with section 103 of CERCLA and section 304 of EPCRA.

(iii) Respondent timely installs all emission control equipment and implements all practices required by this Agreement or contained in the Clean Air Act permits issued in response to the applications submitted in accordance with subparagraph (i) of this paragraph.

(iv) Respondent provides EPA with written certification that it has timely installed all emission control equipment and implemented all practices required by this Agreement or contained in the Clean Air Act permits issued in response to the applications submitted in accordance with subparagraph (i) of this paragraph, within 30 days of meeting those requirements or within 30 days of acknowledgment of compliance by the Permitting Authority if such acknowledgment is required.

(D) Respondent's failure to comply with any of the above requirements in this paragraph at any particular Source shall affect the release and covenant not to sue for the noncompliant Source only and shall not affect the release and covenant not to sue for Respondent's complying Sources. In addition, Respondent's failure to comply with any of the above requirements in this paragraph at any particular Facility shall affect the release and covenant not to sue for the noncompliant Facility only and shall not affect the release and covenant not to sue for Respondent's complying Facilities.

29. For any Farm listed in Attachment A that is owned and operated by a Contract Grower, Respondent is not responsible for complying with paragraphs 28, 30 and 60. However, the release and covenant not to sue described in paragraph 26 covers Respondent's liability for violations with respect to the Emission Units located at such Farm if, and only if, the Contract Grower complies with all the requirements of paragraph 28. The Contract Grower's liability for violations with respect to the Emission Units located at that Farm is not covered by any of the releases and covenants not to sue set forth in this Agreement. However, the Contract Grower may enter its own agreement with EPA (thus becoming a respondent in its own agreement) and obtain similar conditional releases and covenants not to sue with respect to the emission units at its farm.

30. In addition, the release and covenant not to sue described in paragraph 26 covers violations with respect to the Emission Units located at a Farm listed in Attachment A if, and only if, Respondent complies with the following requirements, with respect to that Farm:

(A) During the period in which potential violations at the Farm are covered by the release and covenant not to sue as described in paragraph 26, Respondent complies with all final actions and final orders issued by the State or Local Authority that address a Nuisance arising from air emissions at the Farm and that are:

(i) Issued after Respondent has been given notice and opportunity to be heard (including any available judicial review) as required by applicable state or local law; and,

(ii) Issued during the time period in which potential violations at the Farm are covered by the release and covenant not to sue as described in paragraph 26.

(B) Within 60 days of coming into compliance with the final action or order of the State or Local Authority, Respondent provides EPA with written certification that Respondent has complied with the final action or final order and within the time schedule approved by the State or Local Authority.

31. Respondent agrees that the statute of limitations for all claims covered by the release and covenant not to sue in paragraph 26 will be tolled from the date this Agreement is approved by the EAB and until the earlier of: (a) 120 days after Respondent files the required certifications in accordance with paragraph 28(B) or paragraph 28(C)(iv), or (b) December 31, 2011. This time period can be extended by written agreement of both parties.

32. EPA will publish Emissions-Estimating Methodologies within 18 months of the conclusion of the monitoring period and will publish such Methodologies on a rolling basis as soon as they are developed. If EPA's Science Advisory Board determines that EPA is unable to publish Emissions-Estimating Methodologies applicable to a particular type of Emission Unit in Attachment A within 18 months of the conclusion of the monitoring period because of inadequate data, EPA will attempt to resolve such data problems as soon as possible. EPA's inability to publish an Emissions-Estimating Methodology for a particular type of Emission Unit in Attachment A within 18 months shall have no effect on any other deadline or provision of this Agreement for any other type of Emission Unit listed in Attachment A.

33. As a condition of its participation in this Agreement, Respondent agrees to accept, regardless of any collateral proceeding, the study protocols employed in and the emissions data developed by, the national air emissions monitoring study conducted under the plan described in paragraphs 53 through 63 below. If Respondent challenges the protocols employed or the data developed, the release and covenant not to sue described in paragraph 26 of this Agreement will become null and void and will have no effect on Respondent's past or future liability.

34. Respondent may choose to install and operate one or more systems that process

Agricultural Livestock Waste to produce electricity (a waste-to-energy system). If Respondent selects this option, it will have, with respect to a Farm at which such a system will be installed, an additional 180 days to comply with the requirements of paragraph 28 provided the following requirements are met, with respect to that Farm:

(A) Within 120 days after EPA has published Emissions-Estimating Methodologies applicable to the Emission Units at Respondent's Source, Respondent provides EPA with a written certification that it intends to install a waste-to-energy system, identifies each Farm at which such a system is or will be installed, and describes the type of waste-to-energy system installed and the percentage by volume of Agricultural Waste processed by the system at each Farm.

(B) The waste-to-energy system processes at least 50 percent of the Agricultural Waste by volume produced at the Farm.

(C) Respondent makes each Farm at which a waste-to-energy system is installed available for inspection by EPA.

(D) Respondent agrees to operate the waste-to-energy system for 24 months from the first date of operation or the date EPA publishes Emissions-Estimating Methodologies for the Emission Units at Respondent's Source, whichever is later. If during that 24-month period Respondent has to shut down the waste-to-energy system, the benefits of this paragraph will still be applicable if Respondent has made all reasonable efforts to maintain and operate the system.

(E) Respondent obtains, within applicable time limits, all required federal and state permits needed to construct and operate the waste-to-energy system at the Farm.

35. Subject to paragraphs 27, 37 and 43, if during the pendency of the nationwide monitoring study, Respondent promptly reports and corrects a civil violation of a federally approved SIP or an approved Federal implementation plan (FIP) resulting from emissions of Volatile Organic Compounds (VOCs), Hydrogen Sulfide (H_2S), Ammonia (NH_3), or Particulate Matter (TSP, PM10, and PM2.5) from a Farm listed in Attachment A that causes or contributes to a violation of any provision of the federally approved SIP that requires compliance with an ambient air quality standard at the Farm's property line, EPA releases and covenants not to sue Respondent for the reported and corrected violation if, and only if, the conditions set forth below are met:

(A) Unless Respondent first learned of the violation through a notice from EPA, Respondent provides notice of the violation to EPA and the applicable Permitting Authority within 21 days of Respondent's discovery of the violation or the final order of the EAB approving this Agreement, whichever is later;

(B) Respondent corrects the violation, including making any necessary adjustments to its operations at the Farm to prevent the violation from happening again, within 60 days after notice is given by Respondent or EPA as described in subparagraph (A) above. If the violation cannot reasonably be corrected within 60 days, Respondent must, before the end of the 60-day time period, submit a plan that is ultimately approved by EPA and the applicable Permitting Authority to correct the violation and must comply with the approved plan in accordance with the specified schedule. Within 30 days of correcting the violation, Respondent shall submit a written certification to EPA indicating that it has corrected the violation in accordance with the approved plan; and,

(C) The violation is not a repeated violation that Respondent previously reported to EPA pursuant to this paragraph. Respondent may rectify the loss of the above release and covenant not to sue for the first instance of a repeat violation; however, if it pays a stipulated penalty of $500 a day for each day that the Farm exceeds the ambient air quality standard, and it meets the requirements of subparagraphs (A) and (B), except that the time to correct the violation shall be 30 days instead of 60 days.

36. All certifications that Respondent must submit to comply with this Agreement shall include the following statement:

I certify under penalty of law that the information contained in this submittal to EPA is accurate, true, and complete. I understand that there are significant civil and criminal penalties for making false or misleading statements to the United States government.

The above statement shall be signed by a responsible official for the Respondent (*i.e.,* the owner if Respondent is a sole proprietorship, the managing partner if Respondent is a partnership, or a responsible corporate official if Respondent is an incorporated entity).

37. The releases and covenants not to sue described in paragraphs 26 and 35 do not cover Respondent's liability for any violation with respect to an Emission Unit located at a Farm if Respondent fails to comply with any of the applicable requirements of this Agreement with respect to that Emission Unit, including the limitations and conditions in paragraphs 26–29 and 33–34 above. The releases and covenants not to sue described in paragraphs 26 and 35 cover only violations with respect to the Emission Units located at the Farm that occur before the earlier of: (a) The date Respondent submits the last required certification covering those Emission Units; or (b) 2 years after Respondent submits any permit applications pursuant to paragraph 28(C)(i). This time period can be extended by a period not to exceed 6 months upon written agreement of both parties provided the Respondent's action or inaction is not the cause of any delay in obtaining a permit.

38. EPA will notify Respondent if EPA has determined that it cannot develop Emissions-Estimating Methodologies for any Emission Units listed in Attachment A.

(A) This notice shall identify (individually or by category) Emission Units, Sources and/or Facilities for which Emissions-Estimating Methodologies cannot be developed.

(B) For the Emission Units identified in such a notice:

(i) No certification under paragraph 28 shall be required for those Emission Units and any other related Emission Units that comprise the Source or Facility; and,

(ii) The releases and covenants not to sue described in paragraphs 26 and 35 shall cover potential violations that occur on or before 120 days after the date the notice is mailed, but shall not cover potential violations that occur more than 120 days after that date.

(C) Notice required under this paragraph will be deemed proper if sent via U.S. mail postage prepaid to the address listed in Attachment A.

39. The execution of this Agreement is not an admission of liability by Respondent, and Respondent neither admits nor denies that it has violated any provisions of the Clean Air Act, CERCLA or EPCRA.

40. Respondent waives its right to request an adjudicatory hearing on this Agreement, and its right, created by Clean Air Act section 113(a)(4), to confer with the Administrator before this Agreement takes effect. Respondent further waives its right to seek judicial review of the penalty assessed in paragraph 48.

41. Respondent and EPA represent that they are duly authorized to execute this Agreement, and that the persons signing this Agreement on their behalf are duly authorized to bind Respondent and EPA, respectively, to the terms of this Agreement.

42. Respondent agrees not to claim or attempt to claim a federal income tax deduction or credit covering all or any part of the civil penalty paid to the United States Treasurer. Any payments made in connection with the national air emissions monitoring study do not constitute a fine or penalty and are not paid in settlement of any actual or potential liability for a fine or penalty.

43. This Agreement is without prejudice to all rights of EPA against Respondent with respect to any claims not expressly covered by the releases and covenants not to sue contained in paragraphs 26 and 35. This Agreement does not limit in any way EPA's authority to restrain Respondent or otherwise act in any situations that may present an imminent and substantial endangerment to public health, welfare or the environment. In addition, the releases and covenants not to sue in paragraphs 26 and 35 do not cover any criminal liability.

44. With respect to any claims not expressly released herein, in any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, penalties, recovery of response costs or other relief relating to a Farm listed in Attachment A, Respondent shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant proceeding.

45. Respondent recognizes that EPA may not execute this Agreement if EPA determines that there will be inadequate funding for the national air emissions monitoring study or if EPA determines that there is inadequate representation of eligible animal groups and types of Farms, Facilities or Emission Units.

46. Respondent and EPA stipulate to the issuance of the proposed Final Order below.

[Participating Company], Respondent

By: _____
(Print Name): _____
Title: _____
Dated: _____

U.S. Environmental Protection Agency, Complainant

By: _____
Title: _____
Dated: _____

IV. Final Order

It is hereby ordered and adjudged as follows:

Compliance

47. Respondent shall comply with all terms of this Agreement.

Penalty

48. Respondent is hereby assessed a penalty based on the number and size of the Farms listed in Attachment A as follows:

(A) If Respondent has only one Farm and that Farm is below the ''large Concentrated Animal Feeding Operation'' threshold for that animal species,[4] Respondent is assessed a penalty of $200.

(B) All other Respondents are assessed a penalty of $500 per Farm, unless the Farm contains more than 10 times the total number of animals that defines the ''large Concentrated Animal Feeding Operation'' threshold. For those Farms, Respondent is assessed a penalty of $1,000 per Farm.

(C) The total penalty paid by Respondent shall not exceed:

$10,000 if Attachment A lists 1–10 Farms

$30,000 if Attachment A lists 11–50 Farms

$60,000 if Attachment A lists 51–100 Farms

$80,000 if Attachment A lists 101–150 Farms

$90,000 if Attachment A lists 151–200 Farms

$100,000 if Attachment A lists more than 200 Farms.

49. Respondent shall pay the assessed penalty no later than 30 calendar days from the date an executed copy of this Agreement is received by Respondent (hereinafter referred to as the ''Agreement Date'').

50. All penalty assessment monies under this Agreement shall be paid by certified check or money order, payable to the United States Treasurer, and mailed to: U.S. Environmental Protection Agency (Washington, DC Hearing Clerk), P.O. Box 360277, Pittsburgh, Pennsylvania 15251–6277. A transmittal letter, indicating Respondent's name, complete address, and this case docket number must accompany the payment. Respondent shall file a copy of the check and of the transmittal letter by mailing it to: Headquarters Hearing Clerk, US EPA, 1921 Jefferson Davis Hwy, Crystal Mall #2, Room 104, Arlington, VA 22202.

51. Failure to pay the penalty assessed under this Agreement may subject Respondent to a civil action pursuant to section 113(d)(5) of the Clean Air Act, 42 U.S.C. 7413(d)(5), to collect any unpaid portion of the monies owed, together with interest, handling charges, enforcement expenses, including attorney fees and nonpayment penalties. In any such collection action, the validity, amount or appropriateness of this Order or the penalty assessed hereunder is not subject to review.

52. Pursuant to 42 U.S.C. 7413(d)(5) and 31 U.S.C. 3717, Respondent shall pay the following amounts:

(A) *Interest.* Any unpaid portion of the assessed penalty shall bear interest at the rate established pursuant to 26 U.S.C. 6621(a)(2) from the date an executed copy of this Agreement is received by Respondent; provided, however, that no interest shall be payable on any portion of the assessed penalty that is paid within 30 days of the Agreement Date.

(B) *Attorney Fees, Collection Cost, Nonpayment Penalty.* Should Respondent fail to pay on a timely basis the amount of the assessed penalty, Respondent shall be required to pay, in addition to such penalty and interest, the United States' enforcement expenses, including but not limited to attorney fees and costs incurred by the United States for collection proceedings, and a quarterly nonpayment penalty for each quarter during which such failure to pay persists. Such nonpayment penalty shall be 10 percent of the aggregate amount of Respondent's outstanding penalties and nonpayment penalties accrued from the beginning of such quarter.

(C) *Payment.* Interest, attorney fees, collection costs, and nonpayment penalties related to Respondent's failure to timely pay the assessed penalty shall be made in accordance with subparagraphs (A) and (B) of this paragraph.

Monitoring Fund

53. Respondent has a shared responsibility for funding and implementing the national air emissions monitoring study described in paragraphs 53 through 63.

(A) Respondent individually shall be responsible for paying the lesser of: (a) $2,500 for each Farm listed in Attachment A to this Agreement; or (b) Respondent's pro rata share of the amount needed to fully fund the monitoring study (''Full Funding Level''), including any unfunded balance of the monitoring study, consistent with the provisions of paragraph 62. Respondent's pro rata share shall be based on the number of Farms listed in Attachment A divided by the total number of discrete Farms of the same species that share responsibility for funding the national monitoring study. The Full Funding Level is the amount of money actually needed to fully and adequately fund the monitoring study described in this Agreement. The Full Funding Level shall be initially estimated within 60 days of the Agreement date and shall be included as part of the proposed plan to conduct the monitoring described in paragraph 55. The estimated Full Funding Level shall be used to determine the pro rata share of the monitoring fund payment for which Respondent is initially responsible. Any shortfalls that occur because the estimated Full Funding Level was less than the actual Full Funding Level shall be handled in accordance with this paragraph and paragraph 62.

(B) Respondent shall have no obligation to contribute money to the national monitoring study on behalf of a Farm listed in Attachment A if: (a) That Farm has been listed as a contract farm in another agreement that is identical to this agreement except for the respondent involved, and (b) the respondent to the other Agreement has agreed to be responsible for the payment of monies into the monitoring study for that Farm.

54. Respondent shall have met its shared responsibility for funding and implementing the national air emissions monitoring study, including any individual payments by Respondent under paragraph 53 or 62 if, and only if: (a) A nonprofit entity is established for the purposes set forth below; (b) the monitoring fund obligations to the nonprofit entity are fully satisfied; (c) the nonprofit entity enters into a contract with an Independent Monitoring Contractor (the ''IMC'') that obligates the IMC to fulfill the requirements set forth in paragraphs 55 through 59 and 62 of this Agreement; and, (d) Respondent grants access to Farms listed in Attachment A in accordance with paragraphs 60 and 61. The purposes of the nonprofit entity shall include: collecting and holding Respondent's contributions to the national air emissions monitoring study, purchasing and holding title to research equipment, contracting with an IMC to conduct the monitoring study, and other responsibilities.

55. The contract identified in paragraph 54 shall require the IMC to submit to EPA, within 60 days of the Agreement date, a detailed plan to conduct the nationwide monitoring study set forth in Attachment B. The proposed plan shall:

(A) Identify the IMC and its qualifications, including the qualifications of any subcontracted science advisors, for implementing the national air emissions monitoring study;

(B) Be consistent with, expand the explanation of, and include all of the elements of the monitoring study outline set forth in Attachment B to this Agreement, including the requirements that: (1) All monitoring be completed within 2 years of EPA's approval of the monitoring study; (2) a comprehensive quality assurance program be implemented as part of the study; and (3) the emissions to be monitored will be Particulate Matter (TSP, PM10, and PM2.5), Hydrogen Sulfide (H_2S), Ammonia (NH_3), and Volatile Organic Compounds (VOCs);

(C) Identify the Farms to be monitored and the justification for including those Farms based on the specifications for the monitoring set forth in Attachment B; and,

(D) Require the IMC to submit detailed quarterly reports to EPA and to the entity described in paragraph 54. Those reports shall discuss the IMC's progress in implementing the approved monitoring plan, including what it did during the previous 3 months and what it intends to do during the next three months. The IMC shall submit quarterly reports starting with the end of the first calendar quarter (*i.e.,* March 31, June 30, September 30 or December 31) after the proposed monitoring plan is approved by EPA, unless the plan is approved by EPA with less than 30 days left in the current

[4] Ibid.

calendar quarter. If that occurs, the IMC shall submit the first quarterly report at the end of the next calendar quarter. The quarterly reports shall continue through the end of the calendar quarter during which the national monitoring study is completed.

56. EPA will review and approve or disapprove the proposed plan within 30 days of receiving it from the IMC. If the proposed plan is disapproved, EPA will specifically state why it is being disapproved and what changes need to be made. The IMC shall then have 30 days from the date EPA disapproves the proposed plan to modify it and to submit the modified plan to EPA for review and approval. If the IMC does not submit a plan that is ultimately approved by EPA, the releases and covenants not to sue set forth in paragraphs 26 and 35 of this Agreement shall be null and void.

57. Once the plan is approved, the contract between the nonprofit entity identified in paragraph 54 and the IMC shall require the IMC to fully implement the approved plan in accordance with the approved schedule. Failure of the IMC to implement the approved plan in accordance with the approved schedule, unless specifically excused by EPA in writing, shall nullify the releases and covenants not to sue set forth in paragraphs 26 and 35 of the Agreement. The estimated Full Funding Level monies shall be transferred to the nonprofit entity described in paragraph 54 within 60 days of EPA's approval of the monitoring plan.

58. The contract identified in paragraph 54 shall require the IMC to schedule periodic meetings (either by phone or in person) with EPA, and additional meetings upon request by EPA or the IMC, to discuss progress in implementing the approved plan. The IMC shall be required to promptly inform EPA of any problems in implementing the approved plan that have occurred or are anticipated to occur or of any adjustments that may be needed. No changes may be made to the approved plan without the written consent of EPA.

59. All emissions data generated and all analyses of the data made by the IMC during the nationwide monitoring study shall be provided to EPA as soon as possible in a form and through means acceptable to EPA. The parties agree that all emissions data will be fully available to the public, and that Respondent waives any right to claim any privilege with respect to such data.

60. Respondent agrees to make the Farms listed in Attachment A available for emissions monitoring under the national air emissions monitoring study if the Farm is chosen as a monitoring site under the approved plan. As stated in paragraph 29, if the Farm is owned by a Contract Grower, this requirement does not apply. However, a Contract Grower who enters into its own agreement with EPA (thus becoming a respondent in its own agreement) is subject to this requirement.

61. Respondent also agrees to give EPA or its representative access to those Farms for the purpose of verifying their suitability for monitoring or to observe monitoring conducted under the approved nationwide monitoring plan. EPA agrees that prior to entering a Farm, it will comply with proper biosecurity measures as are normal and customary. Nothing in this Agreement is intended in any way to limit EPA's inspection, monitoring, and information collection authorities under the Clean Air Act, CERCLA or EPCRA.

62. If, prior to completion of the national air emissions monitoring study, it appears that there will be insufficient funds to complete the study, the IMC shall notify EPA of this problem within 30 days of making this determination. The notice shall contain a detailed explanation of why there are insufficient funds, account for all money spent, and identify how much more money is needed to complete the monitoring study. If Respondent is not required under paragraph 53 to contribute or secure the contribution of additional money to the national monitoring study that will be sufficient to complete the monitoring study, the IMC or the nonprofit entity described in paragraph 54 shall make all reasonable efforts to find additional funding to complete the monitoring study. The IMC or the nonprofit entity described in paragraph 54 shall advise EPA of the efforts to locate additional funding and shall not commit to the use of additional funding sources without the prior approval of EPA. If, despite the best efforts of Respondent or its representative, the IMC, or the nonprofit entity described in paragraph 54, the national monitoring study cannot be completed due to lack of funding, then the releases and covenants not to sue set forth in paragraphs 26 and 35 of this Agreement will no longer be in effect. For Farms with animal types for which sufficient funds were provided to fully and adequately fund their portion of the national monitoring study, EPA shall make reasonable efforts to avoid terminating the releases and covenants not to sue set forth in paragraphs 26 and 35.

63. If, after completion of the national monitoring study, there is unspent money in the national monitoring fund, the IMC shall notify EPA within 90 days of completion of the monitoring study. The notice shall contain a detailed explanation of why there are unspent funds, including an accounting of all money spent to implement the national monitoring study and how much is left unspent. The notice shall also include a proposed plan for distribution of the leftover money.

64. All certifications required by this Agreement shall be submitted to: Special Litigation and Projects Division (2248A), Attn: AFO/CAFO certifications, Office of Regulatory Enforcement, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

65. Except for a Farm for which Respondent, or the Contract Grower, is able to certify under paragraph 27(B), this document constitutes an "enforcement response" as that term is used in the Clean Air Act Penalty Policy and an "enforcement action" as that term is used in the EPCRA/CERCLA Penalty Policy.

66. Each party shall bear its own costs, fees, and disbursements in this action, except where explicitly stated as otherwise in this Agreement.

67. The provisions of this Agreement shall be binding on Respondent, its officers, directors, employees, agents, successors and assigns.

68. This Agreement is not binding and without legal effect unless and until approved by the Environmental Appeals Board.

It is so ordered.

Dated this | | | | | day of | | | | |, 2005.

| | | | | | | | | | | | | | | | | | | | | | | | | | |

Environmental Appeals Judge
Environmental Appeals Board
U.S. Environmental Protection Agency

Attachment A to the Consent Agreement

This Attachment identifies and describes the Farms and Emission Units covered by this Agreement. This Agreement has no effect on any Farm or Emission Unit not specifically listed on this Attachment. The terms used in this Attachment shall have the meaning given to those terms in the Agreement.

The attached Farm Information Sheets and Emission Unit Information Sheets provide information about each Farm and Emission Unit(s) to be covered by this Agreement. A separate form for each Farm and each Emission Unit covered by the Agreement is attached below and as such is an integral part of this Attachment. By identifying a Farm for coverage under the Agreement, Respondent is asserting that the Farm meets the definition of a Farm in the Agreement and contains at least one Emission Unit as defined in the Agreement. Also by identifying an Emission Unit at a Farm for coverage under the Agreement, Respondent is asserting that the Emission Unit meets the definition of an Emission Unit in the Agreement. Unless Respondent identifies a Contract Grower for a Farm, Respondent is also asserting it owns, operates or otherwise controls the Farm.

I certify under penalty of law that the information contained in this submittal to EPA is accurate, true, and complete. I understand that there are significant civil and criminal penalties for making false or misleading statements to the United States Government.

[Signature] | | | | | | | | | | | | | | | | |

[Name] [Title] [Date]
[Participating Company]
[Participating Company's Address]

Farm Information Sheet (Example) (Fill Out One Sheet for Each Farm)

Name of Farm: | | | | | | | | | | | | | | |

Is the Farm owned and operated by a Contract Grower or is otherwise a contract farm?

| | | yes | | | no

Name of Contract Grower (if applicable): | |

Location: | | | | | | | | | | | | | | | | |
(street address, city, county, state)

Animal Type (check all that apply):

| | | Poultry (layers)
| | | Poultry (broilers)
| | | Poultry (turkeys)
| | | Dairy Cattle (heifers or milking cattle)
| | | Swine (nursery, sow or finisher)
| | | Other (please identify)

For all Farms that Respondent owns and/or operates, provide a Farm sketch/diagram that numbers or otherwise identifies all Emission Units listed on this Farm Information Sheet.

Emission Unit Information Sheet (Example) (Fill Out One Sheet for Each Emission Unit)

Name of Farm where Emission Unit is located: I I I I I I I I I I I I I I I I I I I I
Unit name and/or number: I I I I I I I I
Date placed in service: I I I I I I I I I I
Design capacity (No. of animals or No. of gallons): I I I I I I I I I I I I I I I I I I I I

If the Emission Unit is a manure storage and treatment system in use at the Farm, check all that apply:

I I I pull plug/flush/in-ground manure storage basin (if lagoon, specify type)
I I I deep pit/in-ground manure storage basin (if lagoon specify type)
I I I shallow pit/open manure storage
I I I shallow pit/closed manure storage
I I I deep pit/open manure storage
I I I deep pit/closed manure storage
I I I manure belt/closed manure storage
I I I manure belt/open manure storage
I I I flush/open manure storage
I I I flush/closed manure storage
I I I scrape/open manure storage
I I I scrape/closed manure storage
I I I other (briefly describe)

If the Emission Unit is a building, enclosure, or structure that permanently or temporarily houses Agricultural Livestock, check all that apply with respect to the ventilation type:

I I I natural
I I I mechanical
I I I other (please describe)

Emission Control Technology (please list type and briefly describe if applicable):

Attachment B—National Air Emissions Monitoring Study Protocol; Overview & Summary

Executive Summary

This document provides an overview and summary of a monitoring study protocol for collecting air emissions data from the egg, broiler chicken, turkey, dairy and swine industries. This protocol was developed through a collaborative effort of industry experts, university scientists, government scientists, and other stakeholders knowledgeable in the field. Although the effort was facilitated by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA), this product represents the opinions of the scientists, government experts, and stakeholders involved. In addition, there was extensive internal review and input by representatives from U.S. EPA's Office of Enforcement and Compliance Assurance, Office of Air and Radiation, and Office of Research and Development.

This protocol is designed to provide a framework for development of a comprehensive field sampling plan for collecting quality-assured air emission data from representative livestock and poultry farms in the U.S. As recommended in the National Academy of Sciences (NAS) 2003 report,[5] and paraphrased here, * * * EPA and USDA should for the short term, initiate and conduct a coordinated research program designed to produce a scientifically sound basis for measuring and estimating air emissions from AFOs. Specific recommendations being addressed with this protocol are related to direct measurements at sample farms; utilizing information on the relationships between air emissions and animal types, nutrient outputs, manure handling practices, animal numbers, climate, and other factors, conducting these studies to evaluate the extent to which ambient atmospheric concentrations of the various pollutants of interest are consistent with estimated farm emissions; and using scientifically sound and practical protocols for measuring pollutant emission rates. The research program will involve additional recommendations from the NAS, which entails developing a process-based model that considers the entire animal production process. The data collected in the monitoring study will lay the groundwork for developing these more process-related emission estimates. However, as with any large and complex effort, this work must be conducted over a period of years.

In the development of this protocol, several alternate techniques were considered. The Science Advisor, in designing the monitoring study, may choose to use an alternate technique that is deemed most appropriate for a particular study unit. (A listing of alternate techniques can be found later in this protocol.) Thus, this protocol does not exclude use or consideration of any measurement methods or technologies that have been demonstrated to be scientifically sound and/or widely accepted for application to collecting air emissions data from the relevant farm sectors. However, the use of alternate techniques is dependent upon EPA approval of a comprehensive study design and budget.

The benchmark data collected and subsequent analyses and interpretation will allow EPA and livestock and poultry producers to reasonably determine which farms are subject to the regulatory provisions of the Clean Air Act and reporting requirements of CERCLA and EPCRA. Following sound scientific principles and using accepted instrumentation and methods, the monitoring study will collect new data from a number of farms across the country and will also evaluate existing emissions data from other selected studies that may meet EPA quality assurance criteria. Together, they will form a database to which additional studies of air emissions and the effectiveness control technologies can be compared.

EPA will review and approve (as described in the Consent Agreement) a comprehensive study design and plan, including a Quality Assurance Project Plan (QAPP), and a budget for all aspects of the monitoring study. The QAPP will outline appropriate procedures to ensure acceptable accuracy, precision, representativeness, and comparability of the data; and will specify the use of properly maintained and reliable instrumentation, sampling schedules, ready supply of spare parts, approved analytical methodologies and standard operation procedures, description of routine quality control (QC) checks, external validation of data, well-trained analysts, field blanks, electrical backups, audits, documentation and format of data submission, and other procedural requirements. Chain of custody documentation will be used for samples of particulate matter. Wetted materials for gas sampling will be Teflon□, stainless steel or glass. All sampling flow rates will be calibrated.

Monitoring Study Responsibilities

Several groups of management and technical staff will be responsible for success of the study. Their responsibilities are discussed here and graphically illustrated in the following flow chart.

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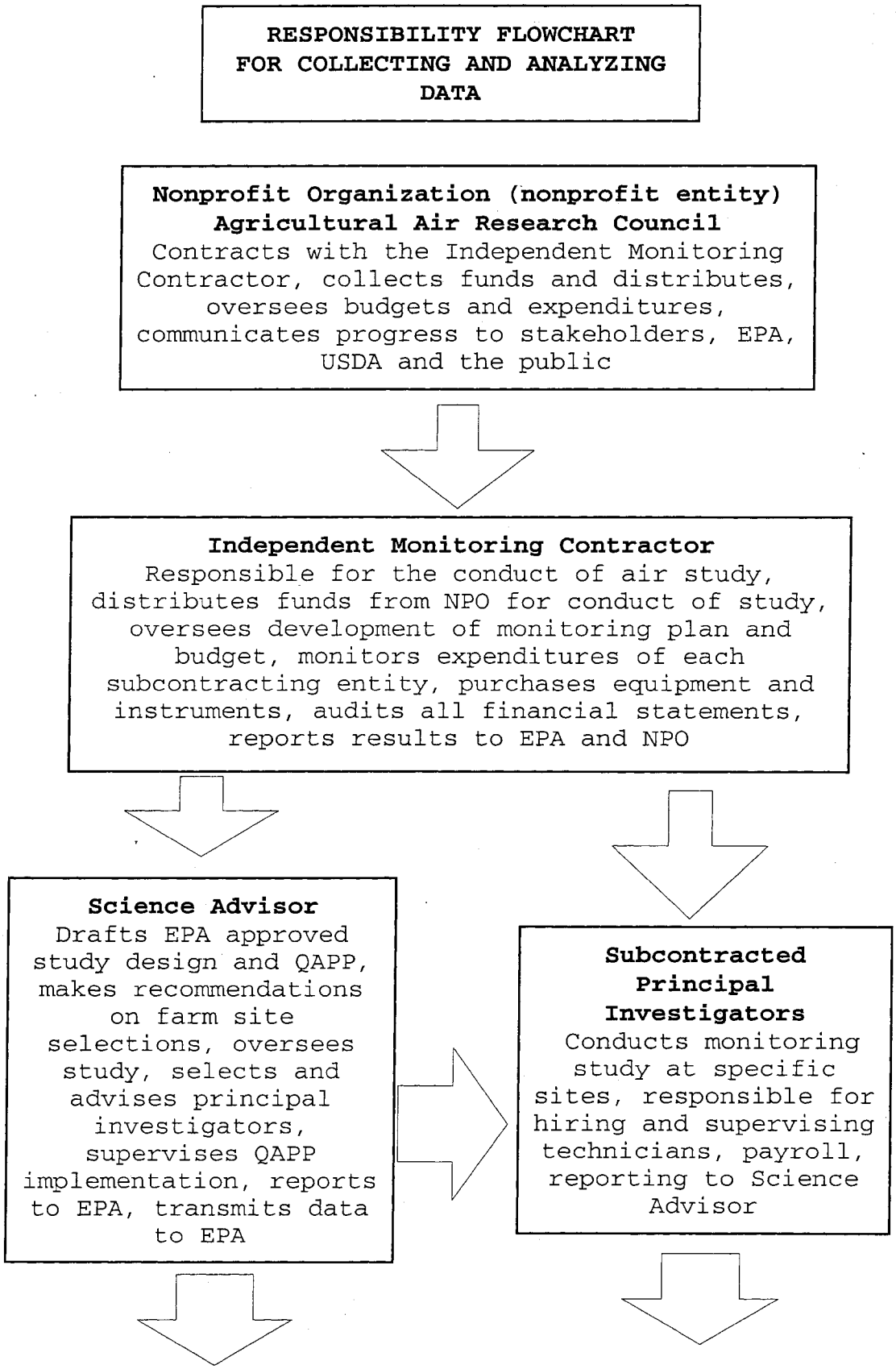
[5] NAS, "Air Emissions From Animal Feeding Operations: Current Knowledge, Future Needs," National Research Council, 2003.



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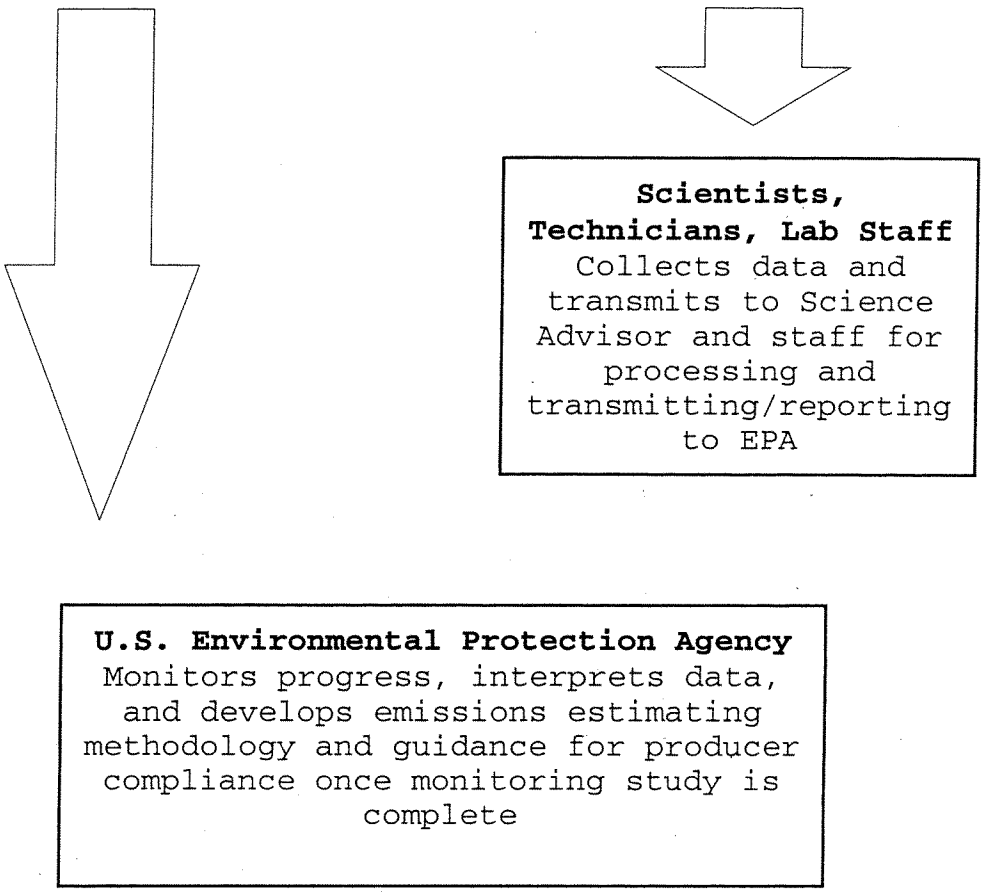
The Nonprofit Organization (NPO)

Industry has established a nonprofit entity (Agricultural Air Research Council, or AARC, and referred to as the nonprofit organization or NPO in the Consent Agreement) to handle the funds contributed by individual participating organizations. The NPO will operate like a company with voting members who elect a board of directors. The board of directors will meet regularly, receive reports on the progress of the study, approve the budget, and review audits of expenditures.



The NPO will be responsible for:

• Selecting the Science Advisor and Independent Monitoring Contractor (IMC);

• Holding and disbursing to the Independent Monitoring Contractor the funds necessary to complete the study according to its approved schedule, protocol and budget; and

• Communicating progress of the study to livestock and poultry producers, the media and other interested parties.

Selection of the IMC and Science Advisor

The NPO will choose an IMC and a Science Advisor based on qualifications, experience and familiarity with all components of the subject matter. The IMC and the Science Advisor must be well staffed with accountants and contract managers who are well versed in fiduciary management. EPA will review the NPO's selection. If EPA believes the qualification criteria have not been met, the NPO will have to select an alternate candidate.

Role of Science Advisor

To be technically qualified, the Science Advisor must have an extensive background in animal agriculture, including expertise in air emissions from animal feeding operations, data processing, and engineering processes. The Science Advisor will be responsible for drafting the comprehensive study design and QAPP and will submit these to EPA for approval. He/She will also coordinate with the IMC to oversee the work of the subcontracted Principal Investigators on the study. The Science Advisor will be employed by the IMC.

Roles of the Independent Monitoring Contractor (IMC)

Technical & Administrative Oversight

The IMC will be contractually responsible for the conduct of the study, and will:

• Be a separate organization from the industry that funds the study;

• Oversee the performance of the Science Advisor;

• Work closely with the Science Advisor in purchasing and assembling equipment and developing contracts for principal investigators; and

• Directly administer all subcontracts, supervise budgets and monitor expenditures, report progress and audit all financial statements.

Reporting on Study Progress

The IMC will:

• Report to EPA and the NPO on financial status of the study;

• Report to EPA and the NPO on the study progress; and

• Create a Web site specifically for the monitoring study and regularly post updates so that the public can follow the study's progress.

Role of the Principal Investigators

Principal investigators will carry out the monitoring at each site. They will report to the Science Advisor and, in turn, to the IMC.

Site Selection

The NPO will be comprised of representatives from the various animal husbandry industries who are knowledgeable of actual farming operations as related to the farm sites proposed for monitoring. They will compile a list of candidate farms from those operations participating in the Consent Agreement and submit the list to the Science

Advisor. The Science Advisor will then facilitate a process to select farms for monitoring based on a set of pertinent factors (*e.g.,* differing regional and climatic conditions, number of animals, different manure handling practices, and types of ventilation (natural vs. forced air)). In addition, logistical issues will be considered to reduce problems associated with egress and convenience; such as, is there a principal investigator located within 3 hours of the site, are there housing accommodations available within 1 hour of the site, is there internet access at the farm, and is 220 V power available? After comprehensive site plans are approved by EPA, the Science Advisor will supervise the set up of equipment at those farms selected, advise the cooperating farmers of their responsibilities, verify utilities, arrange for high speed computer data transmission service, initiate the study and implement the quality assurance project plan. As the study progresses, some investigators may want to alter their approved plans due to interim findings (such as, collecting redundant data or discovering a need to change equipment location). Any changes must be sent to the Science Advisor, with EPA notification and concurrence, for approval or disapproval.

Monitoring Plans by Species

On the following pages, the swine, egg layer, meat bird (broiler and turkey) and dairy air emissions study components are summarized. These were developed over several months by a peer review team of scientists, industry and other stakeholders. While the study scope varies from species to species in line with their data needs, available funding, and industry characteristics, the technologies and measurement methodologies selected by the team are consistent across species.

1. Air Emission Monitoring Plan for Swine

Introduction: Swine production phases include sows (breeding, gestation, and farrowing), nursery pigs, and finishing pigs. The buildings are either naturally ventilated or mechanically ventilated but many buildings have a combination of the two ventilation types. Manure treatment and/or storage generally consists of either basins (earthen, clay or synthetic lined earthen, concrete, glass lined steel) that store manure collected from the barn, or clay/synthetic lined earthen anaerobic treatment lagoons that treat and store manure. Manure collection systems with external manure storage/treatment are generally scrape, flush or pull-plug.

Overall, the U.S. hog inventory is located in three general regions. The five top Midwest swine states, IA, MN, IL, MO, and IN represent about 54 percent of the total inventory in the U.S. In the Southeast, NC, AR, VA, KY, and MS represent about 19 percent, and in the West, OK, NE, KS, SD, and TX represent about 15 percent.

Farm Selection for New Measurements: Swine production farm types are identified by region, production phase, ventilation type, and manure storage/treatment in Table 1. Farms selected will be characterized by criteria such as facility age, size, design and management, local topography and meteorology, swine diet and genetics. The farm should be reasonably isolated from other potential air pollution sources. Producers/farm managers must be willing to attend a training session, make changes as needed to accommodate the project, and maintain and share certain production records to facilitate data analysis and interpretation. Farms to be monitored will be further characterized using farm management data and samples collected for analysis of water, feed and manure. Farms will provide vital management information regarding ventilation controls/management and scheduling of barn activities such as manure management, animal load out, animal treatment, or feeding. At a minimum, water, feed and manure samples will be collected and analyzed for total nitrogen and total sulfur content.

TABLE 1.—FARM SITES IDENTIFIED AND PROPOSED FOR MONITORING

[G = gestation, F = farrowing, FI = finishing, MV = mechanically ventilated]

Production phase	Ventilation type	Number of units	Location of measurements	
			Barns or rooms	Storage/lagoon treatment
SOUTHEAST:				
Sow	MV	4	G & F.	
		Single or double		Lagoon.
Finisher	MV	4	FI.	
		Single or double		Lagoon.
MIDWEST:				
Sow	MV	4	G & F.	
		2		Deep pit.
Finisher	MV	4	FI.	
		1		Basin.
WEST:				
Sow	MV	4	G & F.	
		Single or double		Lagoon.

Methods: The mass balance technique will be used for measuring emissions from mechanically ventilated barns. Micrometeorological techniques will be used for manure storage/treatment systems located outside the barn. Table 2 summarizes the methods and emissions that will be measured from barns and manure storage/treatment systems. A maximum of five farms will be selected for barn measurements and six farms for manure storage/treatment system measurements. If possible, at least one farm will have measurements conducted at both the barns and the manure storage/treatment system.

TABLE 2.—SUMMARY OF EMISSIONS MEASUREMENTS AND METHODOLOGIES

Source units	Methodology	Targeted emissions	Number of farms	Number of units to monitor
Barn	Mass balance	NH_3, PM10, PM2.5 VOC, H_2S, TSP, CO_2.	[1] 5	20
Manure storage/treatment system	Micromet and Water 9	VOC, H_2S, NH_3	[1] 6	6

[1] See Table 1.

Barn Measurements: An on-farm instrumentation shelter (OFIS) will house the equipment for measuring pollutant concentrations at representative air inlets and outlets (primarily by air extraction for gases), barn airflows, operational processes and environmental variables. Sampling will be conducted for 24 months with data logged every 60 seconds. Data will be retrieved with network-connected PCs, formatted, validated, and delivered to EPA for subsequent calculations of emission factors. A multipoint air sampling system in the shelter will draw air sequentially from representative locations (including outdoor air) at the barns and deliver selected streams to a manifold from which on-line gas monitors draw their subsamples. Concentration of constituents of interest will be measured using the following methods:

• Ammonia will be measured using chemiluminescence or photoacoustic ingrared.

• Hydrogen sulfide will be measured with pulsed fluorescence.

• Carbon dioxide will be measured using photoacoustic infrared or equivalent.

• TSP will be measured using an isokinetic multipoint gravimetric method.

• PM2.5 will be measured gravimetrically with a federal reference method for PM2.5 at least for 1 month per site. It will be shared among sites.

• PM10 will be measured in real time using the tapered element oscillating microbalance (TEOM) at representative exhaust locations in the barn and ambient air.

• An initial characterization study of barn volatile organic compounds (VOC) will be conducted on 1 day during the first month at the first site (site 1). While total nonmethane hydrocarbons (NMHC) are continuously monitored using a dual-channel FID analyzer (Method 25A) along with building airflow rate, VOC will be sampled with replication at two barns using Silcosteel canisters, and all-glass impingers (EPA Method 26A). Each sample will be evaluated using concurrent gas chromatography-mass spectrometry (GC–MS) and GC/FID for TO 15 and other FID-responding compounds. VOC mass will be calculated as the sum of individual analytes. The 20 analytes making the greatest contribution to total mass will be identified during the initial characterization study. A sampling method that captures a significant fraction of the VOC mass will be chosen for the remainder of the study.

• The Method 26A sampling train is suitable for collecting samples for analysis of formaldehyde and acetaldehyde using NCASI 94.02, requiring only the addition of spectrophotometry for the detection of formaldehyde. These compounds will be measured during the initial characterization study and, if not found, will not be analyzed during subsequent measurements.

• Total VOC mass may be estimated (scaled) by multiplying the total carbon as determined by Method 25A by the molecular weight/carbon weight ratio derived from GC–MS or GC–FID speciation. This should account for the VOC that are not identified by GC methods due either to sampling bias or the analytical procedures used, although some error is anticipated due to the imprecise response of the Method 25A FID to oxygenated compounds. Acceptance of a scaling factor will depend on whether the Method 25A analyzer response is reasonable based on the manufacturer's stated response factors, bench-scale verification, or judgmental estimation of the mass of unaccounted for VOC.

• By the middle of the second month, the Science Advisor will report results of the initial VOC characterization to EPA with recommendations on the appropriateness and validity of the selected methodologies.

• Quarterly VOC samples using the selected VOC sampling method will occur at all sites, along with continuous Method 25A monitoring at site 1 throughout the study.

• Method 25A measurements will be corrected from an ''as carbon'' basis to a total VOC mass basis by multiplying them by the mean molecular weight per carbon atom established by GC–MS evaluations during applicable intervals of time.

Mechanically ventilated barn airflows will be estimated by continuously measuring fan operational status and building static pressure to calculate fan airflow from field-tested fan performance curves and by directly measuring selected fan airflows using anemometers. Specific processes that directly or indirectly influence barn emissions will be measured including pig activity, manure management/handling, feeding, and lighting. Environmental parameters including heating and cooling operation, floor and manure temperatures, inside and outside air temperatures and humidity, wind speed and direction, and solar radiation will be continuously monitored. Feed and water consumption, manure production and removal, swine mortalities, and animal production will also be monitored. As noted above, samples of feed, water, and manure will be collected and analyzed for total nitrogen and total sulfur. These data will enable the development and validation of process-based emission models in the future.

Table 1 identifies those types of farms where barn measurements will be taken to provide the needed data to complete the objectives of the monitoring study. A total of five farms will be selected as measurement sites. Two farms in the Southeast representing the sow and finishing phases of production with lagoon manure treatment will be selected. Two farms in the Midwest representing a finishing farm using an in-ground manure storage basin and a sow farm with a deep pit gestation barn will be selected. Finally, one farm in the West representing a sow farm with lagoon treatment will be selected. On each of the farms, four barns will have measurements taken simultaneously. Where applicable, the sow farms will have two farrowing rooms and two gestation barn emissions measured and on finishing farms, up to four barns will have emission measurements.

Lagoons: Micrometeorological techniques will be used to estimate emissions of NH_3, H_2S, and a limited number of VOC from lagoons. Fundamentally, this approach will use optical remote sensing (ORS) downwind and upwind of the lagoon coupled with 3-dimensional (3D) wind velocity measurements at heights of 2 and 12 meters (m). The concentrations of NH_3 and the various hydrocarbons will be made using open path Fourier transform infrared spectroscopy (FTIR). Measurements of H_2S (and NH_3) will be made using collocated open path UV differential optical absorption spectroscopy (UV–DOAS) systems. A team of two persons with two scanning FTIR systems, two single-path UV–DOAS systems, and two 3D sonics with supplementary meteorological instruments will move sequentially from farm to farm.

Each of two ORS systems will be oriented parallel to the storage side and approximately 10m from the lagoon edge. Each monostatic FTIR system will scan five retroreflectors; three mounted at 1m height equally dividing the length of the open path along the lagoon side and two mounted on a tower at heights of 6 and 12m located at the corners down the adjacent sides of the lagoon, resulting in scan lines down each of the four sides of the lagoon. Two bistatic single-path UV–DOAS systems will be located at a nominal 2m height within 2m laterally of the FTIR scan lines on the two sides of the lagoon oriented most closely with prevailing winds.

Emissions will be determined from the difference in upwind and downwind concentration measurements using two different methods—a Eulerian Gaussian approach and a Lagrangian Stochastic approach. The Lagrangian approach is based on an inverse dispersion analysis using a backward Lagrangian stochastic method (bLS). This approach will be used to estimate NH_3 emissions from concentration measurements made using the FTIR and UV–DOAS systems and the H_2S emissions from concentration measurements made using the UV–DOAS systems. The emission rate for NH_3 will be the ensemble average of the estimated emissions for each of the five FTIR scans with a corresponding error of the emission estimate. The Eulerian approach is based on a computed tomography (CT) method using Eulerian Gaussian statistics and a fitted wind profile from the two 3D sonics. Measurements of air and lagoon temperatures, wind speed and direction, humidity, atmospheric pressure, and solar radiation will also be conducted.

The bLS and CT emission estimates will be quality assured using tests of instrument response, wind direction and wind speed, stability, turbulence intensity, differences between the lagoon and the surrounding surface temperatures, differences in the mean and turbulent wind components with height, and the temporal variability in emissions. Emission estimates using the CT method will be qualified by the measured fraction of the estimated plume. To estimate VOC emissions from lagoons, samples of the lagoon liquid will be collected and analyzed for VOC, and the EPA model WATER9 will be used to estimate emissions based on measured VOC concentrations, pH, and other factors.

Quality Assurance/Quality Control (QA/QC): QA/QC processes will be established before data collection commences. The QA/QC procedures will be based on EPA guidelines and will include the use of properly maintained and reliable instrumentation, ready supply of spare parts,

approved analytical methodologies and standard operating procedures, external validation of data, well-trained analysts, field blanks, electrical backups, audits, and documentation. Calibration and maintenance logs will be maintained for each instrument.

2. Air Emission Monitoring Plan for Laying Hens

Introduction: Most U.S. layer housing types and manure management schemes fall under one of four categories: (1) High-rise houses with manure stored in the lower level and removed every 1 to 2 years, (2) belt houses with quasi-continuous manure transfer to an external storage/treatment facility, (3) shallow-pit houses with regular manure removal by scraping and temporary storage in uncovered piles, and (4) liquid-manure houses with manure flushed daily into a lagoon. The locations for four sites with specific housing types were recommended for the monitoring study with consideration of these four housing categories along with the potential impact of climatic differences and the geographical density of egg production (Table 3). Final site selections will also depend on site-specific factors including representativeness of facility age, size, design and management, and flock diet and genetics. The facility should be reasonably isolated from other air pollution sources and have potential for testing mitigation strategies. Producers/farm managers must be willing to attend a training session, make changes as needed to accommodate the project, and maintain and share certain production records to facilitate data analysis and interpretation.

TABLE 3.—RECOMMENDED TYPES AND LOCATIONS OF LAYING HEN HOUSES TO BE MONITORED IN THE MONITORING STUDY

Region/location	House 1—type	House 2—type
Midwest	High-rise with inside manure storage (2)	Manure belt (2) with manure storage.
West	Shallow pit with open manure storage	Manure belt with open manure storage.
South	High-rise with inside manure storage	High-rise with inside manure storage.
East	High-rise with inside manure storage	Flushing with anaerobic treatment lagoon

Methods: An on-farm instrument shelter (OFIS) will house the equipment for monitoring pollutant concentrations at representative air inlets and outlets (primarily by air extraction for gases), barn and manure shed airflows, and operational processes and environmental variables. Sampling will be conducted for 24 months with data logged every 60 seconds. Data will be retrieved with network-connected PCs, formatted, validated, and delivered to EPA for subsequent calculations of emission factors. A multipoint air sampling system in the OFIS will draw air sequentially from representative locations (including outdoor air) at the hen houses and manure sheds and deliver selected streams to a manifold from which gas analyzers draw their samples.

Selected pollutants will be evaluated as follows:

- Ammonia will be measured using chemiluminescence or photoacoustic infrared.
- Hydrogen sulfide will be measured with pulsed fluorescence.
- Carbon dioxide will be measured using photoacoustic infrared or equivalent.
- TSP will be measured using an isokinetic multipoint gravimetric method.
- PM2.5 will be measured gravimetrically with a federal reference method for PM2.5 at least for 1 month per site. It will be shared among sites.
- PM10 will be measured in real time using the tapered element oscillating microbalance (TEOM) at representative exhaust locations in the barn, ambient air, and at manure storage exhaust (if manure is disturbed).
- An initial characterization study of barn VOC will be conducted on 1 day during the first month at the first site (site 1). While total nonmethane hydrocarbons (NMHC) are continuously monitored using a dual-channel FID analyzer (Method 25A) along with building airflow rate, VOC will be sampled with replication at two barns using Silcosteel canisters, and all-glass impingers (EPA Method 26A). Each sample will be evaluated using concurrent gas chromatography—mass spectrometry (GC–MS) and GC/FID for TO 15 and other FID-responding compounds. VOC mass will be calculated as the sum of individual analytes. The 20 analytes making the greatest contribution to total mass will be identified during the initial characterization study. A sampling method that captures a significant fraction of the VOC mass will be chosen for the remainder of the study.
- The Method 26A sampling train is suitable for collecting samples for analysis of formaldehyde and acetaldehyde using NCASI 94.02, requiring only the addition of spectrophotometry for the detection of formaldehyde. These compounds will be measured during the initial characterization study and, if not found, will not be analyzed during subsequent measurements.
- Total VOC mass may be estimated (scaled) by multiplying the total carbon as determined by Method 25A by the molecular weight/carbon weight ratio derived from GC–MS or GC–FID speciation. This should account for the VOC that are not identified by GC methods due either to sampling bias or the analytical procedures used, although some error is anticipated due to the imprecise response of the Method 25A FID to oxygenated compounds. Acceptance of a scaling factor will depend on whether the Method 25A analyzer response is reasonable based on the manufacturer's stated response factors, bench-scale verification, or judgmental estimation of unaccounted for VOC mass.
- By the middle of the second month, the Science Advisor will report results of the initial VOC characterization to EPA with recommendations on the appropriateness and validity of the selected methodologies.
- Quarterly VOC samples using the selected VOC sampling method will occur at all sites, along with continuous Method 25A monitoring at site 1 throughout the study.
- Method 25A measurements will be corrected from an "as carbon" basis to a total VOC mass basis by multiplying them by the mean molecular weight per carbon atom established by GC–MS evaluations during applicable intervals of time.

Mechanically ventilated barn airflows will be estimated by continuously measuring fan operational status and building static pressure to calculate fan airflow from field-tested fan performance curves and by directly measuring selected fan airflows using anemometers. Specific processes that directly or indirectly influence air emissions will be measured including hen activity, feeding, and lighting. Measured environmental parameters include cooling system status, manure temperatures, inside and outside air temperatures and humidities, wind speed and direction, and solar radiation. Feed and water consumption, egg production, manure production and removal, and bird mortalities will also be monitored with producer assistance. Samples of feed, eggs, water, and manure will be collected and analyzed for total nitrogen and total sulfur. These data will enable the development and validation of process-based emission models in the future.

Quality assurance/quality control (QA/QC): QA/QC processes will be established before data collection commences. The QA/QC procedures will be based on EPA guidelines and will include the use of properly maintained and reliable instrumentation, ready supply of spare parts, approved analytical methodologies and standard operating procedures, external validation of data, well-trained analysts, field blanks, electrical backups, audits, and documentation. Instrument calibration and maintenance logs will be maintained.

3. Air Emission Monitoring Plan for Meat Birds (Broiler Chickens and Turkeys)

Introduction: Meat birds include broilers and turkeys and are raised in confinement barns on dirt or concrete floors covered with litter. Broiler barns are typically mechanically ventilated and turkey barns are typically naturally ventilated. The locations for three sites with specific housing types were recommended for the monitoring study with consideration of the potential impact of climatic differences and the geographical density of poultry meat production (Table 4). The final site selections will depend on site-

specific emission generating factors including representativeness of facility age, size, design and management; and flock diet and genetics. The facility should be reasonably isolated from other air pollution sources and have potential for testing mitigation strategies. Producers/farm managers must be willing to attend a training session, make changes as needed to accommodate the project, and maintain and share certain production records to facilitate data analysis and interpretation.

TABLE 4.—RECOMMENDED TYPES AND LOCATIONS OF MEAT BIRD HOUSES TO BE MONITORED

Region	Type	Ventilation type	Manure handling
Midwest	Turkey	Mechanical	Litter on floor.
West Coast	Broiler	Mechanical	Litter on floor.
Southeast	Broiler	Mechanical	Litter on floor.

Methods: An on-farm instrument shelter (OFIS) will house the equipment for monitoring pollutant concentrations at representative air inlets and outlets (primarily by air extraction for gases), barn airflows, and operational processes and environmental variables. Sampling will be conducted for 24 months with data logged every 60 seconds. Data will be retrieved with network-connected PCs, formatted, validated, and delivered to EPA for subsequent calculations of emission factors. A multipoint air sampling system in the OFIS will draw air sequentially from representative locations (including outdoor air) at the barns and deliver selected streams to a manifold from which gas analyzers draw their subsamples. The pollutants targeted for measurement will be evaluated as follows:

• Ammonia will be measured using chemiluminescence or photoacoustic infrared.

• Hydrogen sulfide will be measured with pulsed fluorescence.

• Carbon dioxide will be measured using photoacoustic infrared or equivalent.

• TSP will be measured using an isokinetic multipoint gravimetric method.

• PM2.5 will be measured gravimetrically with a federal reference method for PM2.5 at least for 1 month per site. It will be shared among sites.

• PM10 will be measured in real time using the tapered element oscillating microbalance (TEOM) at representative exhaust locations in the barn, and ambient air.

• An initial characterization study of barn VOC will be conducted on 1 day during the first month at the first site (site 1). While total nonmethane hydrocarbons (NMHC) are continuously monitored using a dual-channel FID analyzer (Method 25A) along with building airflow rate, VOC will be sampled with replication at two barns using Silcosteel canisters, and all-glass impingers (EPA Method 26A). Each sample will be evaluated using concurrent gas chromatography—mass spectrometry (GC–MS) and GC/FID for TO 15 and other FID-responding compounds. VOC mass will be calculated as the sum of individual analytes. The 20 analytes making the greatest contribution to total mass will be identified during the initial characterization study. A sampling method that captures a significant fraction of the VOC mass will be chosen for the remainder of the study.

• The Method 26A sampling train is suitable for collecting samples for analysis of formaldehyde and acetaldehyde using NCASI 94.02, requiring only the addition of spectrophotometry for the detection of formaldehyde. These compounds will be measured during the initial characterization study and, if not found, will not be analyzed during subsequent measurements.

• Total VOC mass may be estimated (scaled) by multiplying the total carbon as determined by Method 25A by the molecular weight/carbon weight ratio derived from GC–MS or GC–FID speciation. This should account for the VOC that are not identified by GC methods due either to sampling bias or the analytical procedures used, although some error is anticipated due to the imprecise response of the Method 25A FID to oxygenated compounds. Acceptance of a scaling factor will depend on whether the Method 25A analyzer response is reasonable based on the manufacturer's stated response factors, bench-scale verification, or judgmental estimation of the mass of unaccounted for VOC.

• By the middle of the second month, the Science Advisor will report results of the initial VOC characterization to EPA with recommendations on the appropriateness and validity of the selected methodologies.

• Quarterly VOC samples using the selected VOC sampling method will occur at all sites, along with continuous Method 25A monitoring at site 1 throughout the study.

• Method 25A measurements will be corrected from an ''as carbon'' basis to a total VOC mass basis by multiplying them by the mean molecular weight per carbon atom established by GC–MS evaluations during applicable intervals of time.

Mechanically ventilated barn airflows will be estimated by continuously measuring fan operational status and building static pressure to calculate fan airflow from field-tested fan performance curves and by directly measuring selected fan airflows using anemometers. Specific processes that directly or indirectly influence barn emissions will be measured including bird activity, manure handling, feeding, and lighting. Measured environmental parameters include heating and cooling operation, floor and manure temperatures, inside and outside air temperatures and humidity, wind speed and direction, and solar radiation. Feed and water consumption, manure production and removal, bird mortalities and bird production will also be monitored with producer assistance. Samples of feed, water, and manure will be collected and analyzed for total nitrogen and total sulfur. These data will enable the development and validation of process-based emission models in the future.

Quality Assurance/Quality Control (QA/QC): QA/QC processes will be established before data collection commences. The QA/QC procedures will be based on EPA guidelines and will include the use of properly maintained and reliable instrumentation, ready supply of spare parts, approved analytical methodologies and standard operating procedures, external validation of data, well-trained analysts, field blanks, electrical backups, audits, and documentation. Instrument calibration and maintenance logs will be maintained.

Open Manure Piles: Micrometeorological techniques will be used to estimate emissions of NH_3, H_2S, and a limited number of VOC from open manure piles. Fundamentally, this approach will use optical remote sensing (ORS) downwind and upwind of the source coupled with 3-dimensional (3D) wind velocity measurements at heights of 2 and 12m. The concentrations of NH_3 and the various hydrocarbons will be made using open path Fourier transform infrared spectroscopy (FTIR). Measurements of H_2S (and NH_3) will be made using collocated open path UV differential optical absorption spectroscopy (UV–DOAS) systems. A team of two persons with two scanning FTIR systems, two single-path UV–DOAS systems, and two 3D sonics with supplementary meteorological instruments will move sequentially from farm to farm.

Each of two ORS systems will be oriented parallel to the storage side and approximately 10m from the storage edge. Each monostatic FTIR system will scan five retroreflectors; three mounted at 1m height equally dividing the length of the open path along the storage side and two mounted on a tower at heights of 6 and 12m located at the corners down the adjacent sides of the source, resulting in scan lines down each of the four sides of the storage. Two bistatic single-path UV–DOAS systems will be located at a nominal 2m height within 2m laterally of the FTIR scan lines on the two sides of the manure storage area oriented most closely with prevailing winds.

Emissions will be determined from the difference in upwind and downwind concentration measurements using two different methods—an Eulerian Gaussian approach and a Lagrangian Stochastic approach. The Lagrangian approach is based on an inverse dispersion analysis using a backward Lagrangian stochastic method (bLS). This approach will be used to estimate NH_3 emissions from concentration measurements made using the FTIR and UV–DOAS systems and the H_2S emissions from concentration measurements made using the UV–DOAS systems. The emission rate for NH_3 will be the ensemble average of the

estimated emissions for each of the five FTIR scans with a corresponding error of the emissions estimate. The Eulerian approach is based on a computed tomography (CT) method using Eulerian Gaussian statistics and a fitted wind profile from the two-3D sonics. Measurements of air and storage temperatures, wind speed and direction, humidity, atmospheric pressure, and solar radiation will also be conducted.

The bLS and CT emission estimates will be quality assured using tests of instrument response, wind direction and wind speed, stability, turbulence intensity, differences between the storage and the surrounding surface temperatures, differences in the mean and turbulent wind components with height, and the temporal variability in emissions. Emission estimates using the CT method will be qualified by the measured fraction of the estimated plume.

4. Air Emissions Monitoring Plan for Dairy

Introduction: Dairy operations are naturally ventilated buildings with different manure handling systems. Measurement of the emissions from these operations is to be conducted with a series of measurement systems that provide a concentration measurement along a path that would be representative of the emission plume from the building. In order to estimate the emissions rate, it is necessary to couple the concentration with a measurement of the wind flow through the building or facility.

Manure storage sites could be either liquid (lagoons or slurry store) or piles of solid materials. These sites represent a different source area for emissions than buildings and will have to be considered separately in the measurement scheme.

The protocols that are developed for these studies are based on the following assumptions.

- The buildings are naturally ventilated and require a measurement method that captures the entire plume leaving the building. Mechanically ventilated facilities are beginning to enter the industry.
- Manure storage is separate from the building and will have to be measured as a distinct entity as part of the farm emission factor.
- The primary emissions sources are the housing and feeding areas and manure storage.
- There is a large diversity among dairy operations across the U.S., and although there are similar characteristics in general structure, the difference in building design, management, and climate require measurements of facilities that represent these factors.
- Measurements will be conducted at facilities which represent a diversity of systems in three general areas: California and Southern U.S., Northeast U.S., and Upper Midwest.

Milk production facilities include cattle (dry cows, lactating cows, and replacement heifers) and calves. The partially open barns range from those with windows and flaps to fully open free stalls. The buildings are most typically naturally ventilated except for some mechanically ventilated free stall and tie stall houses. The naturally ventilated barns range from partially open barns with windows and flaps to fully open free stalls. External manure storages generally consist of either earthen basins that store undiluted manure collected from the barn, or anaerobic treatment lagoons that treat manure that is diluted by a factor of about 5:1. Manure collection systems generally are either scrape or flush. Four dairy sites that consider climate and types of ventilation, manure collection, and manure storage have been identified by the dairy industry for collecting the comprehensive air emission data required by the monitoring study (Table 5). Final site selections will also depend on site-specific factors including representativeness of facility age, size, design and management; and cow diet and genetics. The facility should be isolated from other potential air pollution sources and have potential for testing mitigation strategies. Producers should be willing to make changes and keep extra records to facilitate a quality study.

TABLE 5.—RECOMMENDED TYPES AND LOCATIONS OF DAIRY FACILITIES TO BE MONITORED IN THIS STUDY

Region	Site type	Ventilation**	Manure collection	Manure storage
Midwest	Free stall	Natural	Flush or scrape	Lagoon.
Northeast	Free stall	Natural	Scrape	Basin.
West	Open* free stall	Natural	Flush	Lagoon.
South	Open free stall	Natural	Scrape	Basin.

*Cattle are free to walk outside in open free stall barns.
**If warranted by current or future use, mechanically ventilated barns may be monitored.

Methods

Naturally Ventilated Buildings: To achieve the most representative measurements of the emissions of the gases, it is recommended that a FTIR system be used to quantify the concentration of NH_3, CO_2, and, at levels above 50 parts per billion (ppb), H_2S in various paths through the atmosphere. A variation of the horizontal gradient method utilizing multiple paths through the airflow from the building, called radial plume mapping, measures the concentrations. The FTIR method is selected because of the extreme turbulence adjacent to the building and the lack of a defined plume in this area of the facility. A scanning system rotates among the paths to provide a serial measurement of the paths utilizing horizontally and vertically located retro-reflectors. A computer calculates the concentration gradients in real time. FTIR measurements are coupled to two sonic anemometers positioned at two locations along the length of the building to provide the wind flow measurements needed to estimate the flux from the measured concentrations.

Particulate load would be sampled using a series of particle samplers located with a sampling height of 5m adjacent to one of the sonic anemometer towers. These units would be designed to collect 2.5µm, 10µm and TSP values.

VOC would be sampled at the same position as the particulate samples for the building emissions. VOC emissions from the manure storage would be sampled with a system located both upwind and downwind of the manure storage system. These units would be positioned at heights of 2 and 12m.

Mechanically Ventilated Buildings: Mechanically ventilated buildings have begun to be used in the dairy industry. If warranted by current or future use, a mechanically ventilated facility will be included in this project. An on-site instrument shelter (OSIS) will house the equipment for monitoring pollutant concentrations at representative air inlets and outlets (primarily by air extraction), barn airflows, and operational processes and environmental variables. Sampling will be conducted for 24 months with data logged every 60 seconds. Data will be retrieved with network-connected PCs, formatted, validated, and delivered to EPA as hourly averages for subsequent calculations of emission factors. A multipoint air sampling system in the OSIS will draw air sequentially from representative locations (including ambient) at the barns and deliver selected streams to a manifold from which on-line gas monitors draw their subsamples. The pollutants targeted for measurement will be evaluated as follows:

- Ammonia will be measured using chemiluminescence or photoacoustic infrared.
- Hydrogen sulfide will be measured with pulsed fluorescence.
- Carbon dioxide will be measured using photoacoustic infrared or equivalent.
- TSP will be measured using an isokinetic multipoint gravimetric method.
- PM2.5 will be measured gravimetrically with a federal reference method for PM2.5 at least for 1 month per site. It will be shared among sites.
- PM10 concentrations will be measured in real time using the tapered element oscillating microbalance (TEOM) at representative exhaust locations in the barn and ambient air.
- An initial characterization study of barn VOC will be conducted on 1 day during the first month at the first site (site 1). While total nonmethane hydrocarbons (NMHC) are

continuously monitored using a dual-channel FID analyzer (Method 25A) along with building airflow rate, VOC will be sampled with replication at two barns using Silcosteel canisters, and all-glass impingers (EPA Method 26A). Each sample will be evaluated using concurrent gas chromatography—mass spectrometry (GC–MS) and GC/FID for TO 15 and other FID-responding compounds. VOC mass will be calculated as the sum of individual analytes. The 20 analytes making the greatest contribution to total mass will be identified during the initial characterization study. A sampling method that captures a significant fraction of the VOC mass will be chosen for the remainder of the study.

• The Method 26A sampling train is suitable for collecting samples for analysis of formaldehyde and acetaldehyde using NCASI 94.02, requiring only the addition of spectrophotometry for the detection of formaldehyde. These compounds will be measured during the initial characterization study and, if not found, will not be analyzed during subsequent measurements.

• Total VOC mass may be estimated (scaled) by multiplying the total carbon as determined by Method 25A by the molecular weight/carbon weight ratio derived from GC–MS or GC–FID speciation. This should account for the VOC that are not identified by GC methods due either to sampling bias or the analytical procedures used, although some error is anticipated due to the imprecise response of Method 25A FID to oxygenated compounds. Acceptance of a scaling factor will depend on whether the Method 25A analyzer response is reasonable based on the manufacturer's stated response factors, bench-scale verification, or judgmental estimation of the mass of unaccounted for VOC.

• By the middle of the second month, the Science Advisor will report results of the initial VOC characterization to EPA with recommendations on the appropriateness and validity of the selected methodologies.

• Quarterly VOC samples using the selected VOC sampling method will occur at all sites, along with continuous Method 25A monitoring at site 1 throughout the study.

• Method 25A measurements will be corrected from an ''as carbon'' basis to a total VOC mass basis by multiplying them by the mean molecular weight per carbon atom established by GC–MS evaluations during applicable intervals of time.

Manure Storage Systems: Micrometeorological techniques will be used to estimate emissions of NH_3, H_2S, and a limited number of VOC from manure storage systems and storages. Fundamentally, this approach will use optical remote sensing (ORS) downwind and upwind of the storage coupled with 3-dimensional (3D) wind velocity measurements at heights of 2 and 12m. The concentrations of NH_3 and the various hydrocarbons will be made using open path Fourier transform infrared spectroscopy (FTIR). Measurements of H_2S (and NH_3) will be made using collocated open path UV differential optical absorption spectroscopy (UV–DOAS) systems. A team of two persons with two scanning FTIR systems, two single-path UV–DOAS systems, and two 3D sonics with supplementary meteorological instruments will move sequentially from farm to farm.

Each of two ORS systems will be oriented parallel to the storage side and approximately 10m from the storage edge. Each monostatic FTIR system will scan five retroreflectors; three mounted at 1m height equally dividing the length of the open path along the storage side and two mounted on a tower at heights of 6 and 12m located at the corners down the adjacent sides of the storage, resulting in scan lines down each of the four sides of the storage. Two bistatic single-path UV–DOAS systems will be located at a nominal 2m height within 2m laterally of the FTIR scan lines on the two sides of the storage oriented most closely with prevailing winds.

Emissions will be determined from the difference in upwind and downwind concentration measurements using two different methods—an Eulerian Gaussian approach and a Lagrangian Stochastic approach. The Lagrangian approach is based on an inverse dispersion analysis using a backward Lagrangian stochastic method (bLS). This approach will be used to estimate NH_3 emissions from concentration measurements made using the FTIR and UV–DOAS systems and the H_2S emissions from concentration measurements made using the UV–DOAS systems. The emission rate for NH_3 will be the ensemble average of the estimated emissions for each of the five FTIR scans with a corresponding error of the emission estimate. The Eulerian approach is based on a computed tomography (CT) method using Eulerian Gaussian statistics and a fitted wind profile from the two 3D sonics. Measurements of air and storage temperatures, wind speed and direction, humidity, atmospheric pressure, and solar radiation will also be conducted.

The bLS and CT emission estimates will be quality assured using tests of instrument response, wind direction and wind speed, stability, turbulence intensity, differences between the storage and the surrounding surface temperatures, differences in the mean and turbulent wind components with height, and the temporal variability in emissions. Emission estimates using the CT method will be qualified by the measured fraction of the estimated plume.

To estimate VOC emissions from lagoons, samples of the lagoon liquid will be collected and analyzed for VOC, and the EPA model WATER9 will be used to estimate emissions based on measured VOC concentrations, pH, and other factors.

Alternate Techniques

1. For the circuit rider system, an instrumental system such as the DustTrak by TSI could be used for continuous particle data for PM2.5 and PM10. These systems provide optical light scattering measurements of the concentration in mg/m3 and cost about $5,000 per point including an environmental shelter.

2. A radial plume mapping approach could be applied to the manure storage systems using a TDL system that has been approved by EPA for use in the aluminum industry in a single path mode. One upwind and three downwind paths provide the same type of data as the FTIR except for a single compound. The single laser is scanned via fiberoptic cables to the individual paths with a complete scan taking 40 seconds. It provides a fast, direct measurement of the flux of ammonia from these manure systems. A single 4-channel system costs $68,000.

3. It is recommended that one short-term (2-week) measurement of each facility be made with a LIDAR system to measure and quantify the plume dynamics of particles, water vapor, and ammonia surrounding the facility. This is recommended because the short-term measurements will be made at different times throughout the year and will be placed at a series of heights based on experience. These associated data of the plume structure will provide evidence of representativeness of the micrometeorological measurements for the emission rates.

4. It is recommended that each building site be instrumented with temperature and associated sensors to provide a continuous measurement record of the microclimate within and adjacent to the building. These systems can be linked with sensors to measure and record animal activity and floor temperature. A similar system would be located to measure the microclimate of the manure storage system and would include air temperature, wind speed, wind direction, surface temperature, and relative humidity of the manure storage system. The continuous record from these manure storage units and buildings would provide a reference for the short-term measurements made with the FTIR systems.

5. A Dynamic Flux Chamber Technique could be used for performing emission measurements from lagoons and/or a manure pile. Ammonia flux is measured over a surface (lagoon and/or soil) using a dynamic flux chamber system interfaced to an environmentally controlled mobile laboratory. This flux chamber system is interfaced to an environmentally controlled mobile laboratory in which two ammonia chemiluminescence analyzers, gas dilution/ titration calibration system, and data logger with lap-top computer are located. The flux calculation of ammonia using the flow-through chamber system is given by the mass balance for ammonia in the chamber.

Typical Factors Used in Determining Farm Selection

Farm Characteristics

1. Did the producer sign up to the Consent Agreement and pay EPA?
2. Does the producer's farm fit the description of any of the farms listed?
3. Is there a principal investigator within 3 hours of the site?
4. Are there housing accommodations available within 1 hour of the site?
5. Does your site have mechanical or natural ventilation for barns? Do the fans blow out directly over the lagoon/ manure storage area?
6. Is the producer/farm manager cooperative to attend a training session and provide needed production information?
7. Is there internet access at the farm? Is 220 V power available?
8. What is the general topography on the farm? Describe the surrounding terrain

(rolling hills, flat, low lying, river bottom, etc.) specifically for areas near the barns and the manure storage/treatment system.

9. Is the farm free from large disturbances such as trees and other buildings?

10. What is the distance from a public road? Is it gravel?

11. Are there other potential air pollutant sources nearby? Explain type (other farms, industrial site, grain elevator/feedmill), distance and direction.

12. Are there other animal species housed on the site, or planned for housing on site?

13. How many barns are located on the site? How many animals in each barn? Please characterize the barns: Barn number/identifier, production phase, rate your barn cleanliness (1–5; 1 being the cleanest), age of barns, and air exchange rate.

14. How far are the land application fields from the lagoons and barns?

15. How often is manure removed from the manure treatment/storage system and land applied?

16. How often is manure removed from the buildings and sent to the outdoor treatment/storage system?

17. Describe (in general terms) the rations fed to the animals.

18. Are the animals hand-fed or is feed delivered through an automatic delivery system?

19. Is fat (vegetable or animal) added to the rations?

20. Are feed rations pelleted or ground?

INFLUENCES ON EMISSIONS

Influences	Producer provided	Collected by study
Climate		X
Air temperature		X
Manure temperature		X
Barn temperature		X
Wind speed		X
Solar radiation		X
Rainfall		X
Relative humidity		X
Wind direction		X
Feed conversion/efficiency		X
Feed analysis (N & P & S)	X	X
Phases		X
Feeding to recommendations	X	
Manure production volume	X	X
Management cycle	X	
Storage duration	X	
Stocking density (actual)		X
Lagoon design	X	X
Swine genetics	X	
Animal inventory	X	
Feed usage	X	
Water usage	X	
Closeouts	X	
Feed analysis	X	X
Water analysis		X
Manure analysis	X	X
Animal/barn activity	X	X

[FR Doc. 05–1536 Filed 1–28–05; 8:45 am]

BILLING CODE 6560–50–P