



Livestock Project Submittal Form

Instructions: Please complete all fields as thoroughly as possible. If the project in question is still in the planning/ development phase, all fields must be completed using best available data and estimates based on the proposed system design. This is an interactive Word form. Upon completion, please save this form as a PDF prior to uploading it to the Reserve software. This will lock your answers and protect the document from any further changes. All fields must be completed, even if the answer is also provided elsewhere; if a field is not applicable insert N/A in the space provided. Upon approval, this form will become public.

Reserve project ID (numerical, as it appears in the Reserve software): **CAR893**

Project crediting period (select only one):

First crediting period Second crediting period

Section 1: Project Contact Information

Project name (as it appears in the Reserve software): **Duke Carbon Offsets Initiative - Loyd Ray Farms**

Account holder (as it appears in the Reserve software): **Duke Carbon Offsets Initiative**

Is the account holder authorized to sign the "Attestation of Title" form? Yes No

Biogas control system owner: **Loyd Bryant, Loyd Ray Farms, Inc.**

Technical consultants: **Cavanaugh and Associates, PA**

Other parties with a material interest: **Duke Energy**

Date of form completion: **August 29, 2011**

Form completed by (name, organization): **David Cooley, Duke University**

Section 2: Project Site Information

1. Name of livestock operation: **Loyd Ray Farms, Inc.**
2. Project description (please provide one to two paragraphs): **Duke University and Duke Energy have partnered to install an innovative animal waste management system on an 8,640-head swine farm in Yadkin County, North Carolina. The system, described below, will generate greenhouse gas emission credits ("Carbon Offsets") through the destruction of methane, renewable electricity using a microturbine, and corresponding renewable energy credits ("RECs"). It will also eliminate the discharge**

of animal waste to surface waters and groundwater through direct discharge, seepage, or runoff. The system was installed and became operational on May 17, 2011. The project is expected to last for a period of ten years.

3. Project site address (including county and country): **Loyd Ray Farms, Inc., 1948 Casstevens Road, Yadkinville, Yadkin County, North Carolina 27011, United States of America**
4. Owner of livestock operation (name and organization): **Loyd Bryant, Loyd Ray Farms, Inc.**
5. Description of the type of operation (e.g., dairy, swine, etc.): **swine**
6. If dairy,
 - a. Average number of total animals:
 - b. Type(s) of manure collection system (e.g., scrape, flush, etc.) and frequency of manure collection:
 - c. Description of pre-project (baseline) manure management system :
 - d. Respective fraction of the manure from the milking herd, dry cows, and heifers that was sent to an anaerobic storage system pre-project:
7. If swine,
 - a. Type of swine operation (e.g., farrow-to-wean, farrow plus nursery, farrow-to-finish, etc.): **Feeder-to-finish**
 - b. Average number of total animals: **8,640**
 - c. Type(s) of manure collection systems (e.g., flush, pull-plug pit, etc.) and frequency of manure collection: **Pull-plug pit; houses are flushed weekly**
 - d. Description of pre-project (baseline) manure management system: **Lagoon and spray-field system**
 - e. Respective fraction of the manure from the breeding, nursery, and/or grow/finish swine sent to an anaerobic storage system pre-project? **100%**

Section 4: Project Eligibility and Monitoring

8. Please select the project protocol under which this project is being submitted:
 - U.S. Livestock Project Protocol, Version **3.0**
 - Mexico Livestock Project Protocol, Version
9. Project start date (format MM/DD/YYYY): **05/17/2011**

10. First reporting period (MM/DD/YYYY): **05/17/2011** to **05/17/2012**

11. Has this project been submitted to another registry or program? If so, has the project been accepted (listed, approved, pre-approved, etc.) by the other registry or program? **No**

12. Have any vintage reduction tonnes from the project ever been registered with or claimed by another registry or program prior to registering with the Reserve?

Yes No

If the answer is yes, you must complete and return a "Project Transfer" form.

13. Have any GHG reductions from the project ever been sold directly to a third party (i.e. sold without being registered with or claimed by another registry or program) prior to submitting to the Reserve? (If yes, please describe.): **No**

14. Does/Did the baseline anaerobic waste handling system(s) comply with the specifications provided in the Natural Resources Conservation Service Conservation Practice Standard Waste Treatment Lagoon, No. 359, and/or Conservation Practice Standard, Waste Storage Facility, No. 313?

Yes No

Comments (if any):

15. Description and citation of local and state air and water quality regulations pertinent to the project: **North Carolina swine waste management system performance standards require that new projects 1) eliminate the discharge of animal waste to surface waters and groundwater through direct discharge, seepage, or runoff; 2) substantially eliminate atmospheric emission of ammonia; 3) substantially eliminate odors; 4) substantially eliminate the release of disease-transmitting vectors and airborne pathogens; 5) substantially eliminate nutrient and heavy metal contamination of soil and groundwater. The farm was grandfathered in under the old requirements and did not have to meet these performance standards, but this project helps the farm meet the performance standards.**

16. Provide a summary of the permits obtained to build and operate the biodigester waste handling system: **The North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ) is the leading permitting authority for the project. The farm is covered by an Animal Waste Management System permit from DWQ, as well as an Innovative System permit from DWQ, which covers the digester project. The farm also has an NRCS nutrient management plan.**

17. Is this project being implemented and maintained as the result of any law, statute, regulation, court order, or other preexisting legally binding mandate?

Yes No

If yes, please explain.

18. Has a detailed monitoring plan been developed for this project? If not, what date will a monitoring plan be in place? **Yes**

Section 3: Digester Information

19. Type of digester (e.g., mixed, plug-flow, attached film, or covered lagoon): **Synthetically lined (HDPE) covered anaerobic digester**

20. Name of system designer, address, and other contact information : **William Simmons, Cavanaugh & Associates, P.A., 1904 Eastwood Rd, Suite 205, Wilmington, NC 28403**

21. Digester design assumptions:

- a. Number and type of animals: **8,640**
- b. Pretreatment before digestion (e.g., none, gravity settling, stationary screen, screw press, etc.): **none**
- c. Manure volume, ft³/day (m³/day): **1,848 ft³/day (52.3 m³/day; 13,824 gal/day)**
- d. Wastewater volume, ft³/day (m³/day) (e.g., none, milking center wastewater, confinement facility wash-down, etc.): **8,846 ft³/day (250.5 m³/day; 66,176 gal/day)**
- e. Other waste volume(s), ft³/day (m³/day) (e.g., none, food processing wastes, etc.): **none**
- f. Treatment of digester effluent (e.g., none, solids separation by screening, etc. with details including use or method of disposal): **Clarified water from the digester is sent to a new synthetically lined aeration basin for nitrification, BOD reduction, and further treatment. A portion of the nitrified liquid is then sent back to the barns and used as flush water which leads to further de-nitrification. The remaining nitrified effluent is sent to the former lagoon for storage.**
- g. Method of digester effluent storage (e.g., none, earthen pond, etc.): **Excess cleaned liquid produced on a daily basis (total flow minus flush water) will be pumped to the storage pond (the former lagoon), after denitrification and reaeration.**

22. Fraction of manure being sent to the digester for each animal type **100%**

23. Physical description

- a. General description including types of construction materials (e.g., partially below grade, concrete channel plug-flow with flexible cover, etc.): **An in-ground, synthetically lined (HDPE) covered anaerobic digester with mixing in digester to help with efficiency. Cover will be equipped with a dewatering system for rainwater.**
- b. Dimensions (length and width or diameter and height or depth): **Top length 218.3 ft; top width 174 ft; total depth 13.7 ft; freeboard 2.0 ft; berm width 10.0 ft; design volume 279,773 ft³**

- c. Design hydraulic retention time: **26 days HRT in digester**
- d. Design operating temperature: **minimum of 12 degrees C**
- e. Does the biodigester waste handling system comply with the applicable Natural Resources Conservation Service Conservation Practice Standard (No. 365: Anaerobic Digester—Ambient Temperature or No. 366: Anaerobic Digester—Controlled Temperature):

Yes No

Comments (if any):

24. Provide a description of the biogas destruction system, including number and type of destruction devices, as well as the metering and data collection systems (one to two paragraphs): **The synthetically lined (HDPE) and covered anaerobic digester captures methane and other gases created through the biological processes of anaerobic digestion of organic wastes generated on the farm. A piping system collects the gases, which are directed to a pre-conditioning process to reduce the moisture content of the gas and filter out particulates. The conditioned gas (dehumidified and filtered) is routed to a microturbine and/or a flare to destroy the methane.**

25. Additional information:

End of form