WASTE MANAGEMENT PROGRAMS
COLLEGE OF AGRICULTURE & LIFE SCIENCES

NC STATE UNIVERSITY

Animal and Poultry Waste Management Center

A candidate technology of the North Carolina Agreements Project: Development of Environmentally Superior Technologies per Agreements Between the Attorney General of North Carolina and Smithfield Foods, Premium Standard Farms and Frontline Farmers

Ambient Temperature Anaerobic Digester and Greenhouse for Swine Waste Treatment and Bioresource Recovery at Barham Farm

This project is located on the Julian Barham Farm near Zebulon, North Carolina. The farm is a 4,000 head farrow-to-wean operation on contract with Prestage Farms of Clinton, North Carolina. Julian Barham, the farm owner, is the technology team leader for this project. Other members of the technology team are North Carolina State University faculty members and North Carolina Cooperative Extension specialists.

The ambient digester consists of an impermeable cover over an in-ground digester. Waste is moved from the houses in which pigs are kept to the in-ground digester. Methane gas that is produced during the digestive process is extracted and delivered to a generator, where electricity is produced for use on the farm. Heat from the generator is captured and used to produce hot water that is used by the farm in its production activities. Effluent from the digester flows into a second-stage lagoon that was the primary lagoon before the digester was built. The nutrients in the effluent from the second-stage lagoon are used to fertilize plant and vegetable species in a greenhouse adjacent to the swine production facility.

Covered In-Ground Digester

Several of the unit processes that comprise the ambient digester, such as the ambient temperature anaerobic digester and methane recovery and utilization system, were designed and constructed prior to this initiative with cooperation of the U.S. Environmental Protection Agency AgSTAR Program. The major components that were added under this initiative were the nitrification/denitrification system and a second set of greenhouses, inclusive of an automated irrigation system, which Mr. Barham uses to produce vegetable crops from the nutrients and water that are byproducts of the wastewater treatment process. Mr. Barham currently utilizes the methane recovery system to produce a large portion of the electricity required for his swine production operation.

Construction of the additional unit processes provided under this initiative was completed in mid-December, 2001. The system is currently operational and is being used for sole treatment of the wastewater produced on Mr. Barham's swine production facility. While Mr. Barham must still utilize his coastal Bermudagrass land application system for excess water disposal, the majority of the treated wastewater is routed to the vegetable crop greenhouses, which produce tomatoes for sale by several local retailers.

Ambient Digester *(continued)*

Technology Evaluation Team

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Greenhouse

Nitrification Tanks

Aerial view of Barham Farm. Digester is at far left; greenhouse at far right. Pig houses and original lagoon are in middle.