1973 - 1974

Success Story

DEVELOPMENT OF A TOTAL SWINE WASTE MANAGEMENT SYSTEM WITH TERMINAL LAND APPLICATION

F. J. Humenik, In Charge, Extension
Biological & Agricultural Engineering

Lexington Swine Breeders operates a 300-sow total confinement facility in Davidson County, a few miles south of Lexington, N. C. The total land owned by the company including that covered by buildings, roads, and the waste disposal system is about 20 acres. It is bounded by creeks on two sides which discharge into a prime recreation area about two miles downstream. The village of Linwood is about one-half mile southeast of the buildings, and a large furniture plant is being constructed about 400 yards from the property line.

This operation was purchased by the current owners about June 1971. At that time the single unaerated lagoon was about 4 ft deep, and the purchasers had no doubt that it could handle all waste disposal needs. Approximately one year later they found out just how wrong they had been because by this time the lagoon had a liquid depth of about 8 ft and on occasion overflowed the bank and thus presented a potential hazard to the nearby recreational lake. At this time the owners also received a number of complaints from local residents that the lagoon was producing offensive odors.

The owners realized that they had to then adopt one of three alternatives: (1) pretend that they had no problem and forget it; (2) relocate the entire operation; or (3) seek advice on measures to cope with the problem. Ultimately based on recommendations from the National Animal Feedlot Research Program of the Environmental Protection Agency, help was sought from North Carolina State University. Research and Extension personnel in animal waste management, irrigation, and swine housing decided after preliminary investigations that the problem should be handled in two ways: (1) reduce the level of the existing lagoon and maintain this reduced level

by installation of an irrigation system for disposal of excess liquid on all available land; (2) install another lagoon to serve as an aerated unit prior to the original lagoon. The aeration of this primary lagoon would reduce odors and also lessen the concentration of waste constituents overflowing to the second or original lagoon.

Several sites for the aerated lagoon were considered before deciding on a depressed area between an existing building and the original lagoon. This site was very desirable because this land had little value due to frequent flooding, and it would provide an excellent location for the small lagoon from both an aesthetic and efficiency basis. Upon determining that the creek which flowed through this area could be diverted around the property periphery, it was decided to reroute this creek and construct an overland pretreatment site in association with excavation for the new lagoon.

Part of the irrigation system was installed during 1973. Currently additional irrigation equipment is being installed to apply wastewater to the overland flow plot which drains into the second lagoon, and additional lines are also being placed to recycle lagoon liquid to precharge manure pits and to provide for positive cleaning after gravity emptying. The irrigation pump was designed so that one manure pit or one irrigation line would be provided with sufficient wastewater at any given time to reduce the size and cost of the total irrigation system.

The total waste management system consists of manure pits which empty by gravity, with pump flushing capabilities to provide water precharge and positive cleaning after emptying. Wastewater is initially directed to the aerated unit which has two 5 horsepower floating aerators, and excess liquid continuously overflows into the original unaerated lagoon. The irrigation pump suction is well removed from the aerated lagoon discharge and overland flow input. The irrigation system provides wastewater for flushing or application to the overland and terminal plant-soil receiver plot.

The owners are very satisfied with the portion of this system currently completed because the aerated unit has eliminated the odor problems and the original lagoon does not overflow resulting in a point source discharge since all excess liquid is terminally irrigated on land with vegetative cover.

A preliminary paper on this waste management system is included in the Proceedings of the joint ASAE-North Carolina Irrigation Conference held in Raleigh on November 28 and 29, 1973, and paper proposals on the total system have been submitted for presentation at professional society meetings and the International Symposium on Livestock Waste to be held in 1975.