

High-Tech Lagoon Management

Real-Time Monitoring System Under Development

by Kellie Potucek



Livestock, poultry and dairy producers may soon have the option of installing a high-tech, real-time system to monitor lagoons and other liquid waste retention structures used to store and treat animal manure and wastewater. The system, under development by Texas Agricultural Experiment Station researchers, will help reduce accidental lagoon overflows and discharges associated with impaired water quality.

Drs. Saqib Mukhtar (Biological and Agricultural Engineering), Raghavan Srinivasan (Forest Science), and Brent Auvermann (Amarillo Agricultural Research and Extension Center) comprise the research team.

Permitted animal feeding operations must abide by stringent lagoon design, operation and management standards mandated by the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA). Though the standards were established to prevent overflow under most rainfall conditions, lagoon discharges continue to occur in Texas. More careful lagoon management can reduce the frequency of discharges. Animal feeding operators may allow their lagoon or waste retention structure to approach the overflow mark because traditional monitoring devices, such as depth markers, do not automatically record water levels and are not equipped with warning alarms. The new real-time system addresses these shortcomings by keeping the manager well informed of the liquid level and sounding an alarm when safe levels are exceeded.

Powered by solar panels, the system uses a pressure transducer probe (PTP) to accurately measure lagoon liquid levels. A rain gauge is also included so the relationship between rainfall and lagoon liquid level increases can be analyzed. The data loggers, which record measurements, are connected to a modem, giving operators the ability to download and access real-time data via phone or Internet. The data recording feature is extremely advantageous because TCEQ requires that operators keep detailed records of lagoon conditions. By automating the record keeping process, human errors are minimized, and complete accurate data are maintained.



Additionally, the system is equipped with alarms that alert the operator of problematic liquid levels. When the PTP measures the predetermined level, a strobe light begins to flash and a phone call is automatically placed to the lagoon operator or owner. The level that triggers the alarm can be assigned by individual operators. This flexibility is important because some operators prefer to be notified well in advance of a critical level, particularly in areas where rainfall is frequent.

Installation is not difficult as the PTP can even be attached to existing lagoon structures, such as the depth marker staff. The estimated \$4,000 cost of the system pales in comparison to its numerous managerial and environmental advantages.

“Operators are proactive and they will readily accept and adopt the technology when they see its benefits,” explained Mukhtar.

The team is researching whether long-term exposure to lagoon constituents damages the PTP. Now in the seventh month of operation, results have suggested the system can withstand the harsh environment.