



Flame Engineering and its distributors have been demonstrating the Poultry House Flame Sterilizer across the country, including at Larry Cuzan's Farm in Welsh, Okla. (above) last fall. Photo courtesy of the Oklahoma Propane Gas Association.

Propane Sanitizes Poultry Houses Organically

Just like in the fashion world, agriculture has its trends. What's "in" today is organic produce and organically-raised poultry and livestock. What's out are chemicals, pesticides, and herbicides.

Weed and pest control using propane-fired equipment has been in use for decades. The sterilization of poultry houses was written about in the 1932 edition of *BPN's* "Handbook of Butane-Propane Gases." Even before the propane industry was established, scientists were advocating the use of heat to kill bacteria and other organisms. Louis Pasteur reportedly recommended that surgeons flame their hands to prevent contaminating patients.

Demand for flammers and weed burners fell precipitously with the growing use of chemicals for a variety of ag applications after World War II. However, as consumers now demand organic products, propane's role in producing them is also growing. Most recently, the U.S. Department of Agriculture (USDA) formally recognized thermal weed control using a propane flame or heat as an authorized organic production practice.

While the USDA's announcement covers thermal weed control, it wouldn't be too far-fetched to believe that sterilizing agricultural operations using heat instead of chemicals would meet the definition of an authorized organic production practice. According to Mark Leitman, agriculture programs manager for the Propane Education & Research Council (PERC), the agency's language is open to interpretation as it relates to disease and pest control in animal quarters. There is a list of practices that notes "includes but is not limited to..." Leitman explains that if producers want to be officially labeled as organic, they would have to work with a certifying agent to have their production plans approved. In addition, any grower can petition the National Organic Standards Board for amendments. PERC's Agriculture Advisory Committee has been discussing the certification designation.

A decision by the Texas Animal Health Commission in

mid-2004 could help confirm that the use of heat to sterilize poultry operations is an organic and effective method. Early last year, an outbreak of avian flu shut down several poultry operations in parts of Texas. The commission stipulated that poultry growers affected by the avian flu had to sterilize their egg houses and surrounding land using some form of flaming before they could re-open.

The Texas poultry industry brings in about \$1 billion annually to Texas' ag economy and represents about \$123 million in export dollars. With the news that the avian flu had been found in Texas, a number of countries banned imports from the state. Two farms were quarantined and the chickens had to be destroyed.

Luckily for the poultry farmers, who are under contract with Pilgrim Pride, Wes Welch of Welch Gas (Linden, Texas) had just begun to demonstrate Flame Engineering's (LaCrosse, Kan.) Poultry House Flame Sterilizer in Texas. Welch told *BPN* that Pilgrim Pride initially was going to sterilize the egg houses and equipment using chemicals, an accepted industry practice. However, an inspector with the Texas Animal Health Commission insisted that the only way to completely get rid of the pathogens was to take the additional step of flaming the floor of the four houses affected, the driveway up to the farm, and the surrounding 200 feet or so around each house, which are about 350 feet long.

The sterilizer utilizes six LT 2x8 liquid propane torches that project intense, sweeping flames under a sturdy enclosed steel hood. It maintains heat at approximately 1400°F, hot enough to kill pathogens. A standard 120-gal. tank is recommended to fuel the unit, which is connected to a trailer via a three-point hitch and wires to the 12-v tractor battery. Fuel consumption varies depending on the use. A Red Dragon Hand-Held torch kit is included to light the burners and sterilize the corners and edges of the facility.

Egg houses are harder to sterilize than broiler houses, said Welch. The grower has to remove the equipment. That equip-

ment is sterilized with a chemical. Welch heard about the problem from his local growers and offered to bring over the sterilizer and a tractor. Flame Engineering recommends that the tractor pull the unit at a rate of about 2 mph, but the Commission representative requested that he slow the machine down.

Welch has demonstrated the sterilizer for several Texas poultry growers since April 2004 and has received good feedback. Word of mouth has brought in requests for additional demonstrations, including one from Louisiana. Welch or one of his poultry house customers actually does the demo for the marketer. Welch estimated it costs about \$200/house to do the demonstration.

Generally in the spring, growers will be thoroughly cleaning out their poultry houses down to the dirt floor. Welch or his customer will then take the unit inside and slowly pull the unit across the floor in about six or seven passes. A fan is positioned at one end of the house to keep the air circulating while the unit is in operation. For a 500-sq-ft house, it takes approximately an hour and about 40 gallons of fuel. He will also sterilize the house between growth cycles. The grower cleans out the house and removes about 2 in. of the excrement, then the sterilizer is used to heat the floor to a temperature level that kills the pathogens but doesn't ignite what is left on the floor.

The poultry growers have told Welch that after the sterilization demo, they have seen an increase in their chick survival rate, which they attribute to a cleaner environment.

Ammonia Emissions

In the Southeast, Scott Cosper with Gas Equipment Co. (Dallas) has received great feedback from poultry growers who are impressed with the sterilizer's ability to not only sanitize but also to reduce the ammonia fumes. Gas Equipment received its first unit in September and has done demonstrations in Georgia, North Carolina, and Mississippi.



A standard 120-gal. fuel tank is recommended to supply the sterilizer's six liquid propane torches that maintain the heat at a minimum of 1400°F. Photo courtesy of Welch Gas.



A hand-held torch is used to apply heat along the edges of the poultry shed's walls and corners. Photo courtesy of the Oklahoma Propane Gas Association.

One grower, who also runs a poultry supply company, purchased a unit in December and just ordered a second one.

According to Cosper, one of the first things growers ask about is the sterilizer's ability to reduce ammonia emissions. Flame Engineering has done some preliminary studies on emissions, but Cosper is excited about the University of Georgia ag department's interest in studying the effectiveness of reducing the ammonia and destroying pathogens. USDA is expected to work with the university.

Cosper's customer who purchased a unit in December began using the sterilizer right away in four of his eight houses. In the other houses, he used a chemical sterilizer. The results were very noticeable in the houses that were heated with the sterilizer, said Cosper. The farmer said the lack of ammonia odors was very apparent, and this effect of the sterilizing remained much longer than in the chemically-treated houses.

Representatives of the university and USDA have attended demonstrations put on by Cosper or his customer along with several growers and the poultry companies, also known as integrators, they represent, including Pilgrim Pride, Tyson, and Gold Kist.

Flame Engineering ag manager Steve Koch agrees with the need for additional research to confirm the extent of the sterilizer's effectiveness. Despite successful demonstrations, growers want the hard data, he said. Koch has taken the sterilizer to demonstrations in several Midwestern states and will be demonstrating one for the University of Delaware this spring. They are very interested in checking out the ability of the unit to reduce ammonia emissions as well.

Dr. Susan E. Watkins with the University of Arkansas has done much of the recent research on heat sterilization in poultry sheds. Her research agrees with the findings of Flame Engineering's poultry growers. The exposure to heat in poultry houses reduces substantially pathogens such as *e. coli*, *coliform*, and *salmonella*. By reducing these pathogens, poultry growers saw an increase in chick survival rates and an increase in the health and size of the broilers. —Ann Rey