Funeral Home Wastewater

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Brett Ward, Wastewater Specialist, Municipal Technical Advisory Service, University of Tennessee

Alex Freeman, Lab Analyst, Plateau Utility District/City of Wartburg, Licensed Embalmer

A common question from collection system or wastewater plant operators is “Should I be concerned about funeral home wastewater?”

Generally speaking, the answer is “No.”

Most of the wastewater discharged from a funeral home would fall into the classification of “normal domestic” sewage. This is the discharge from restrooms, laundry, kitchens, and other types of cleaning. Yes, there will be embalming wastewater and it will contain body fluids and embalming fluids; so, for collection system operators the use of normal personal protective equipment (PPE) is advised, and plant operators should also take these steps.

The sanitary sewer system is designed and constructed to transport and treat wastewater and sewage and it is expected to contain body fluids which can contain pathogenic components. There are within most sewer use ordinances, which are mostly based on EPA models, prohibitions against the discharge of “whole blood.” The context of this prohibition is with animal slaughter waste. So, the intent of the prohibition of “whole blood” is the large volume that could come from meat and poultry processing, not from funeral home embalming. During the embalming process, it takes an average of one gallon of solution per 50 pounds of body weight to fully embalm someone, so about 3 to 4 gallons would be an average amount for each body. In addition to this, there would be water used in the disinfection and washing processes, but that would be less water than used in the average shower. About 1.5 gallons of blood circulates in the human body, and this volume is also expelled during the embalming process when it is diluted with the embalming solution and eventually discharged to the sewer. In general, most embalming cases would create under 20 gallons of wastewater per body, not including the associated general funeral home water consumption (1).

There is very little research on funeral home wastewater. Only two sources of discharge details were located. Though published 24 years apart, there are some consistencies. Each listed the volume of wastewater per body embalmed at about 600 gallons per body, but only about 20% of this water was from the actual embalming process (2,3). The remaining water was from restrooms, kitchens, cleaning, and laundry. Most of the water would come from guests and staff using the restrooms and the kitchen, and the other large component would come from washing PPE and clothing with an in-house laundry room.

BOD of actual embalming wastewater could be as high as 600 mg/L but with the dilution from the other sources the diluted discharge to the sewer would be closer to 220 mg/L. Other pollutants of concern in the concentrated embalming wastewater are: TSS about 120 mg/L, TKN about 90 mg/L and total phosphorus around 5 mg/L (2,3).

Concentrated embalming fluid is generally composed of formaldehyde, glutaraldehyde, alcohols, phenolics, and usually some dyes (2). The four main chemical components do have anti-bacterial properties, but all are biodegradable and the concentration within the diluted wastewater discharge will be quite low. The main purpose of the fluids is disinfection and preservation of the body, and this mostly takes place through denaturing proteins. Due to this, embalming fluids cannot act as a nutrient source for bacteria, they are only able to kill bacteria. Embalming fluids are also constantly evolving to become more eco-friendly and biodegradable as many other industries are seeing, so the environmental impact is lessening as time goes on. Plant impacts will depend on the loading. A small system with a busy funeral home may see some elevated plant influent levels of these compounds. Formaldehyde would be the highest but expect 85-100% to be removed in a treatment plant.

For rural funeral homes discharging into a septic system there may be reason to be concerned about the impact of the embalming fluids. But in late 1998, the State of Alabama Department of Environmental Management issued a report concluding that septic systems can treat the residual amounts of preservative solutions and can provide effective removal of bacteria and viruses that may be found in embalming wastewater.

The embalming process involves removing blood and body fluids with embalming solution. The solution is made up of water and a small amount of the concentrated embalming fluid. Bladder, stomach, and intestine contents may or may not be discharged depending upon whether an autopsy was performed prior to the body being embalmed. Most of the discharged liquid would be a mixture of water, embalming fluids, blood, and disinfectants used in the process.

References

(1) Alexandra Freeman, Licensed Embalmer, John A Gupton College of Mortuary Science
(2) National Funeral Directors Association, Funeral Home Wastestream Audit Report, 1996.
(3) Sonya Kleywegt, et, al, The final discharge: Quantifying contaminants in embalming process effluents discharged to sewer in Ontario, Canada, Environmental Pollution September 2019.