

Emergency Mortalities at Hickman Family Farms
With Notes from Literature
By Albert J. Heber, Ph.D., P.E.
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Introduction

An emergency poultry carcass disposal operation was carried out by Hickman's Family Farms (HFF), at 41717 Indian School Road, Tonopah, AZ due to an outbreak of the Avian bird flu (Dana, 2025). The strain H5N1 of avian influenza is the most lethal variation and is known to be transmissible to humans (Kim and Kim, 2012).

Over 2 million chickens were buried in trenches at their Tonopah site with the oversight of the ADEQ (Director Karen Peters), who provided HFF with a temporary emergency waiver and will assure that groundwater is protected by assessing the area's hydrology and geology, even though she claimed that there is no current risk to the aquifer. Therefore, the impact studies will be done afterwards, rather than prior to the burial operation (Dana, June 20, 2025).

Background

There are increasing concerns worldwide about the negative environmental impacts of the burial method used for mass depopulations of animals and birds (Avidov et al., 2023; Flory et al., 2017; Glanville et al., 2009).

Ritter and Chirnside (1995) warned about the impact of poultry carcass burials on ground water quality and called for regulations that require a soil survey by a certified soil scientist prior to subsurface disposal, especially for large amounts of carcasses.

EPA warns that the burial of livestock mortalities can lead to groundwater contamination. Bodily fluids and hazardous gases can impact "health and safety of surrounding humans, livestock and wildlife" (Dana and Simchuk, 2025). Thus, the residents are concerned about their drinking water which comes from wells that are less than 150 ft deep. The trenches were located near local residences, like the home of Liinda Butler.

After first saying that the chickens would go to a landfill, the Department of Agriculture informed the public that the birds at Tonopah will be buried at the site (Dana and Simchuk, 2025). Neighbors have not been given information about the process, not from Hickman's nor the state agencies. Burial is not the top method of carcass disposal as it is less preferred than composting and landfill.

Glenn Hickman equated the mass burial of chicken carcasses to cemeteries and septic systems in terms of contamination and said the number of chickens made no difference

(Dana, 2025). This is a dismissive statement that is not based on facts. His statement that “There’s always going to be concerns” is also dismissive.

Karen Peters’ claim that the aquifer is fine prior to any testing is basically “hoping for the best”. What is the plan if the tests show contamination? (Dana, 2025) This question was answered in a nomination hearing on June 26 (McDaniel, 2025). If the burial of 2 million chickens prior to the pivoting decision to instead require landfilling causes groundwater contamination, then the aquifer will need to be pumped and treated. Members of the public and of the committee believed that the decision to allow burial without a liner exhibited poor judgement.

The Sheldon Jones’ statement about a biosecurity plan implies that perhaps it would obviate the need for an emergency mortality plan (Dana, 2025), which it does not.

Best Management Practices in the Literature

Disposal of dead animals needs to be done within 72 hours in a way that prevents contamination of water and public health hazards (Texas, 2005). Texas (2005) provides a comprehensive list of factors to be evaluated at a burial site during the planning process. It includes soil properties, vertical proximity to bedrock and the water table, horizontal proximity to water bodies and public areas, and setbacks to residences and public areas. Local NRCS offices maintain a soil map for suitability for burial. The map will be divided into soil mapping units.

The location should be above the 100-year floodplain elevation, should allow runoff to be diverted, and should have proper setbacks from surface water, deep wells, residences, drains, etc. (USDA, 2022). Texas (2005) gave minimum setbacks of 50-200 ft from residential property, 150 ft from private well, springs, streams, public areas, and 500 ft from a public well. Surface runoff must not enter the pit.

Texas (2005) recommends that poultry carcasses should be placed in layers not more than 1 ft thick and each covered with 1 ft of soil. The burial site should be mounded with at least two ft of soil, and subsiding soil (Figure 5. Burial sites showing settling of soil. Figure 5) should be replaced with new soil.

Texas (2005) stated that local NRCS offices can provide soil maps with suitability criteria for burying animal mortalities in three classes: 1) not limited, 2) somewhat limited, and 3) very limited. The suitability maps should be used as a preliminary planning tool.

The burial should be timed to minimize the effects of carcass expansion. If permitted, the pit should be uncovered until bloating is completed. Topsoil should be retained to regrade the ground. The pit should not be located in the flood plain. Areas with hard bedrock and

other hard surfaces should be avoided (USDA, 2022). Seepage of leachate must be controlled if there is potential for water contamination. Mortalities should be with at least 2 feet of soil. Pit bottoms must be level and 2 or more feet above the water table. However, Kim and Kim (2012) specified a 6 to 12 ft distance above the water table.

The main problem with the burial method is the migration of leachate formed by carcass decomposition to water resources (Kim and Kim, 2012). The release of leachate, which is slowly released to external environments, is a bigger problem when large numbers of carcasses are buried in a short period of time.

The burial site must be regularly inspected for improper cover, settlement and cracks, improper runoff flow, bare spots and erosion, and rodent and animal damage, all which can develop over time.

Records of the operational details and the emergency mortality response should be kept and provided (USDA, 2022).

Kim and Kim (2012) conducted a review with the express purpose of characterizing the potential microbial contaminants expected to be found in the groundwater around mortality burial pits in Korea where 24 million birds were culled from 2003 to 2011, and 6 million birds were slaughtered and buried in 216 burial pits in 2011. They noted that the burial sites constructed in Korea often had large numbers of carcasses buried without serious consideration of hydrogeologic settings, and may serve as large sources of contamination, which in turn may possibly contaminate the groundwater. This is apparently the same scenario that occurred at Hickman's Family Farms.

It was noted in Kim and Kim (2012) that the complete decay of the buried carcasses may take two years or more, and that contaminants are released until carcass decay is completed. Korean law dictates that monitoring be conducted for two years following burial (Kim and Kim, 2012).

Kim and Pramanik (2016) presented a comprehensive set of procedures and methods for environmental management of burial sites used to control outbreaks of Avian influenza and foot-and-mouth disease. Required measures include leachate wells, gas exhaust, liners, application of lime layers, and monitoring wells. The burial protocol at Hickmans apparently fell far short of these measures.

Contamination Parameters

Flory et al (2017), citing a U.K. study, stated that burial ranked as the highest risk disposal method. Potential hazards include campylobacter, *Escherichia coli*, *Listeria*, *Salmonella B*, anthracis, *Cryptosporidium*, *Giardia*, *Clostridium tetani*, *Clostridium botulinum*,

Leptospira, *Mycobacterium*, tuberculosis v. bovis, *Yersinia*, and hydrogen sulfide. Kim and Kim (2012) identified 4 pathogenic bacteria (*Salmonella typhimurium*, *S. enteritidis*, *Bacillus cereus*, *Clostridium perfringens*) that existed in groundwater contaminated by calf burial. The quantification of coliform bacteria is often used as a surrogate for these disease agents (Kim and Kim, 2012).

Proteolytic and lipolytic bacteria are two important groups of bacteria that participate in carcass decomposition (Kim and Kim, 2012). The most commonly observed proteolytic bacteria are *Enterococcus faecalis*, *E. gallinarum*, *Proteus*, and the *Pseudomonas* species.

Other contaminants to be tested are concentrations of ammonium, ammonia, nitrate, nitrogen, phosphorus (Flory et al., 2017), and biochemical oxygen demand (BOD), total dissolved solids (TDS) and chloride (Kim and Kim, 2012).

In the case of burial of chickens because of an avian influenza (AI) virus outbreak, leachate monitoring of the virus itself should be monitored to make sure the virus is contained and not moving off site (Kim and Pramanik, 2016).

The monitoring around Hickmans should provide concentrations of the following concentrations:

- Avian Influenza virus
- BOD
- TDS
- Chloride
- Ammonium
- Ammonia
- Nitrogen
- Nitrates
- Phosphorus
- Proteolytic bacteria
- Lipolytic bacteria
- Pathogenic bacteria (*Salmonella*, *E. Coli*, etc.)
- Total coliform bacteria

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Figure 1. Burial site photo taken with drone from the north.



Figure 2. Hickmans layer houses at Tonopah. Dust cloud from burial site is visible in upper right corner of the photo.



Figure 3. Burial pit construction.

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Figure 4. Manure conveyors used to load carcasses into trucks.



Figure 5. Burial sites showing settling of soil.



Figure 6. Deep trenches used for burial of mass depopulation mortalities.



Figure 7. Google Earth image showing the burial pit location represented by the red line west of the laying hen houses.