

INCINERATION OF POULTRY CARCASSES: LESSONS LEARNED FROM THE VIRGINIA AVIAN INFLUENZA OUTBREAK OF 2002

¹Robert W. Peer, ²Gary A. Flory and ³Eric S. Bendfeldt

¹Agricultural Program Coordinator, Virginia Department of Environmental Quality, Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801 Phone: (540) 574-7866 Fax: (540) 574-7844 Email: rwpeer@deq.virginia.gov

²Agricultural and Water Quality Assessment Manager, Virginia Department of Environmental Quality, Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801 Phone: (540) 574-7840 Fax: (540) 574-7844 Email: gaflorey@deq.virginia.gov

³Area Specialist, Community Viability, Virginia Cooperative Extension, 2322 Blue Stone Hills Drive, Suite 140, Harrisonburg, Virginia 22801 Phone: (540) 432-6029 Fax: (540) 432-6251 Email: ebendfel@vt.edu

In 2002, an avian influenza (AI) outbreak resulted in the depopulation of 197 poultry farms in 6 counties in Virginia. To help eradicate the virus, Virginia requested USDA-APHIS' assistance. As the number of birds to be depopulated quickly exceeded the logistical capacity of all available landfills, USDA decided to use incineration in air-curtain destructors as a carcass disposal option. Although large scale incineration of poultry carcasses had not previously been attempted during a disease outbreak, incineration was used with limited success to dispose of birds drowned in North Carolina during Hurricane Floyd in 1996. The experience with incineration in Virginia also resulted in limited success. This paper addresses the issues that limited the success of this disposal method in 2002 and provide direction for future operations:



Why did the cost per ton escalate during the operation?

A week prior to placing the units into service, the disposal contractor met with representatives from the Virginia's poultry industry and provided an estimated disposal cost of \$500 per ton of carcass. However, cost per ton during the first few days of operation in Virginia were only \$82 per ton. Because this cost was based on the optimum conditions experienced during the first few days of operation, the cost soon escalated to over \$500 per ton because of the following limitations:

- **Weather**

Heavy rains during the first week of operation thoroughly saturated the stockpiled carcasses and fuel (wood). This severely limited the efficiency of the operation by cooling the fire when the wet wood and carcasses were loaded into the air curtain

destructors. Covering the fuel and carcasses would have limited the effect of precipitation.

- **Quality of Wood**

There was no incentive in the contract between USDA and the disposal contractor to use high BTU fuel wood to efficiently operate the destructors. After the initial delivery of good quality scrap wood, lesser quality wood was burned because it could be procured by the contractor at a very low cost. Undesirable fuel characteristics included rotted and saturated wood, small diameter material, and brush. Another consideration is to limit the amount of metal in the scrap wood, especially if the ash is to be recycled and used as a soil amendment.



- **Equipment Breakdowns**

High temperature and 24-hour operations can often lead to equipment malfunctions. The nature of this operation lends itself to equipment catching on fire. Although the contractor had fire suppression equipment on his trackhoe, the hydraulic lines still caught on fire and were damaged; consequently, the destructors were shut down for over 24 hours for repairs. Carcasses already delivered to the site began to decay and became difficult to burn. These destructors operate at maximum efficiency when they operate continuously. A spare trackhoe should be on site or contracted to be available within a few hours.

- **Scheduling**

Because poultry flocks needed to be disposed of within 24-hours of testing positive for AI, communications between depopulation and incineration crews is critical. As the capacity of available landfills was exceeded, there was pressure on the depopulation crews to route carcasses to the incinerator site. A lack of communication between the depopulation and incineration crews in 2002 resulted in carcasses being delivered to the incineration site before the incineration crew was capable of handling additional carcasses. This situation resulted in carcasses partially decomposing prior to incineration because of the heat generated by the air curtain destructors, the depth of the carcass piles, and the time lag between depopulation to incineration. Another environmental issue relating to the decomposition of carcasses prior to incineration is the release of body fluids from the decomposing carcasses. The large amount of fluid generated by large piles of carcasses

How much wood was needed and how was the ash disposed of?

Approximately 2,300 tons of carcasses were incinerated during the 2002 AI outbreak in Virginia. Over 10,000 tons of wood were utilized as a fuel source with about 4.4 tons of wood needed per ton of carcass. The wood consisted of a wide variety of scrap wood, brush, sawmill waste, and pulpwood. The total amount of material that was incinerated, carcasses and wood, produced over 5,000 tons of ash and unburned materials (2.2 tons of ash



generated per ton of carcass). The ash was initially designated to be disposed of in a local landfill; however, at the request of the Virginia Department of Environmental Quality (VA DEQ), a power screen equipped with a magnet and three different size screens was used to separate the ash into several components. Over 5 tons of scrap metal from scrap wood that was burned was collected and sold to a local metal recycler. Approximately, 250 tons of smaller material (3/4 to 1 1/2 inch) was used by the local landfill for temporary roads, 250 tons of unburned wood (over 1 1/2 inch) was given away as firewood, and the remaining 4,500 tons of material was recycled by local farmers as a soil amendment. The analysis of the ash revealed it had the liming equivalent of .34 tons lime per ton of ash. In addition to the liming benefits of the ash, it also provided 9 pounds of nitrogen, 23 pounds of phosphate, and 11 pounds of potash per ton as a source of plant nutrients. USDA provided an incentive to the farmers of \$10 per ton for transporting the ash from the incineration site to their farm.

What air permits were required, and what air monitoring was performed?

VA DEQ issued an emergency air permit to allow up to 10,000 tons of carcasses to be burned. DEQ conducted air monitoring at several sites on and around the incineration site tested for a variety of pollutants including particulate matter, volatile organic compounds and toxics.

There were numerous odor complaints from area residents near the incineration site, but based on the air monitoring results, the operation did not pose significant health or environmental hazards.

What management techniques were (or should be) used to control smoke and odor?

Since this was the first large scale use of air curtain destructors for the disposal of poultry carcasses in the U.S., most smoke and odor control techniques were learned from mistakes during this experience. These techniques can be implemented during future outbreaks if incineration is used as a carcass disposal option.

- Operation of the units in the evening and night when atmospheric inversions are common result in layered haze. Limiting operations during these inversions may reduce smoke and odor complaints, may not be practical during large outbreaks
- Any situation that causes decomposition of carcasses, such as delivering too many carcasses to the incinerator site will increase smoke and odor. The mass of the carcasses in large piles will generate high internal temperatures and will hasten decomposition. Carcasses that are located near the air curtain destructors and remain in piles for more than a few hours will decompose quicker because of the heat generated from the units.
- Carcasses should be covered to prevent the feathers from getting saturated by precipitation.
- Wood should be covered to protect it from precipitation.
- The loading of wood and carcasses into the air curtain destructors should be closely supervised so air flow and burn temperatures are not adversely affected. If the trackhoe operator loads the air curtain destructors in “clumps”, rather than evenly loading carcasses and wood across the length of the firebox, an increased amount of odor and smoke will result from restricted air flow and decreased burn temperature.
- It is critical to have enough trained operators to load the air curtain destructors. Not having enough trained operators can cause fatigue during 24/7 operations and result in the improper loading and additional smoke and odor as described above. These operators should be rotated every 2 to 3 hours avoid fatigue and potential management problems.



How were neighbor concerns addressed?

Prior to the operation of the air curtain destructors, USDA met with the adjoining residents of the site, and offered to pay for lodging and meals if the smoke and odor was too offensive. However, only a few neighbors took advantage of this offer. During the operation more distant neighbors complained about the smoke and odor; therefore, this offer eventually became impractical to implement.

Why was the incinerator operation shut down?

A combination of factors influenced the decision to discontinue the incineration of carcasses:

- the increasing number of complaints;
- the cost per ton escalated to 2-3 times the cost of landfilling;
- incineration was a difficult carcass disposal option to manage with costs and public nuisance considerations.

What about security, biosecurity, and media relations?

- **Security**

USDA contracted with a private security firm to guard the entrances to the incineration site. The authors are not aware of any breaches of security during the operation.

- **Biosecurity**

USDA had a cleaning and disinfecting (C&D) crew on site 24/7 to clean and disinfect any vehicles exiting the site. All personnel were required to wear Tyvek suits, latex gloves, disposable boots, and hairnets as they exited their vehicles and entered the site.

- **Media Relations**

An integral part of any Incident Command is the Public Information Officer. All media inquiries were routed to this section of the AI Task Force. Surprisingly, very little media attention was devoted to this carcass disposal option.

Conclusion

The experience of incinerating poultry carcasses during the 2002 Avian Influenza Outbreak provides valuable information for consideration as agency and task force personnel decide which carcass disposal options to utilize. Although a large number of poultry carcasses were incinerated in 2002, the issues related to the management of this disposal method such as siting, public relations, smoke and odor control, wood procurement, communications and scheduling the flow of carcasses, and ash disposal make this a less desirable carcass disposal option when compared to landfilling and in-house composting. Another limitation of incineration is that it requires the movement and transportation of infected carcasses off the farm. Although the avian influenza virus was not spread by off-site disposal options such as incineration and landfilling in 2002, movement and transportation of carcasses off the farm increases the risk for disease

transmission to other farms. Similarly, there is greater public awareness today of the potential transmission of the high pathogenic “bird flu” virus to humans. This awareness and heightened concern has created a public relations environment where any off-site movement of carcasses from A.I. positive farms will be closely scrutinized, and most likely not viewed to be an acceptable risk by the general public.