

## Unit Twelve

# Intoxication / Carcass Disposal

## Overview

In this unit you will learn how intoxications (poisoning) can lead to large-scale disasters and what measures reduce the risk of intoxication. You will also learn about issues that need to be considered in carcass disposal.

## Objectives

Upon completion of this unit, you should be able to:

- Identify the factors that contribute to intoxication of livestock and contamination of the food supply
- List measures that can mitigate large-scale intoxications
- Identify issues that should be considered in a plan for carcass disposal
- Determine your awareness of the vulnerability of livestock to intoxicants and the food supply to contaminants
- Determine your level of preparedness to dispose of carcasses

## Intoxication and Contamination

Historically, the greatest concern for food safety in disasters has been the contamination of meat and milk following radio nucleotide fallout. Today we recognize other more likely risks.

An example of a large-scale intoxication occurred in 1973, when polybrominated biphenyl hydrocarbon (PBB), a fire retardant, was inadvertently mixed into commercial livestock rations instead of magnesium oxide. Approximately 30,000 cattle, 6,000 pigs, 1,500 sheep, and 1.5 million chickens died or had to be humanely killed. Also, large amounts of food and feed were destroyed. A year later, more than 95 percent of the milk samples taken from breast-feeding mothers had traces of PBB in them.

Examples of contamination of meat and milk are reported regularly as products contaminated with bacteria, such as *E. coli* O157:H7, *Salmonella* spp., listeriosis are recalled.

These examples illustrate that the human food supply needs to be protected, from the farm through processing and sales.

When the human food supply is threatened by contamination, public health and public perception of the safety of the food supply are at risk. In addition, if many animals die or have to be killed, animal welfare becomes a concern. Another problem is deciding which methods to use for disposing of large numbers of contaminated carcasses and contaminated food.

Intoxication (before processing) of large numbers of animals and contamination (during and after processing) of food may not traditionally be thought of as disasters. However, when these events occur on a large scale, they have many things in common with other types of disasters.

## **Mitigation of Intoxications and Contaminations**

To be able to document and trace contaminated feed, samples from each batch of feed should be retained for several months after purchase. These samples should also be labeled as to when they were delivered, and by whom. This allows you to investigate food-borne diseases that may be difficult to diagnose after the feed has been consumed.

Feed that animals do not finish should be inspected and the reason for lack of palatability should be determined and corrected.

Feed storage areas should be kept free of vermin. Fly and bird control should be practiced to limit the potential introduction and spread of diseases.

## **Biosecurity**

Effective biosecurity is necessary to ensure that livestock are fed safe feed and the food supply remains free of contamination.

Biosecurity starts with obtaining feed, medications, and supplies from reputable sources that can trace goods to their origin.

Biosecurity involves restricting access to feed storage bins to authorized persons only, quality assurance testing of ingredients, and mixing rations fed to livestock.

Monitor animals' water supply for *Salmonella*, coliform bacteria, nitrates, sulfates, pesticides, and other potential contaminants.

At the first sign of unusual or inexplicable animal sickness or death, farmers should consult with a veterinarian or state animal health official to determine the cause.

## **HACCP and Quality Assurance**

Spoilage of the food supply is minimized through interventions based on the Hazard Analysis and Critical Control Point (HACCP). HACCP is also evolving as a system by which to monitor the effectiveness of biosecurity and production on farms. A discussion of HACCP is beyond the scope of this course. Interested readers should take time to learn more about it.

Food safety is also being promoted by several national and state livestock producer associations (e.g., beef industry) which are addressing food safety as part of "Quality Assurance" programs.

## Impact & Consequences

The following table presents some commonly reported problems that arise after intoxications and the unit where you can learn more about the consequence.

<b>Impact</b>	<b>Consequence</b>	<b>Refer to Unit #</b>
Rumors emerge when intoxications occur or are suspected	Communications are challenged	5
Investigating intoxications can overwhelm diagnostic capacity of laboratories	Infrastructure failure	6
Intoxications can be a direct and indirect source of danger to animals and people	Threat to public and animal safety and health	7 and 10
If an intoxication is from a point source, animals may need to be moved away	Need to evacuate people and animals	8
If an area is contaminated, animals may need to be moved	Displacement of animals	9
Intoxications may be dangerous to wildlife	Adverse effects on the natural environment and wildlife	11
Intoxications can kill livestock	Need for carcass disposal	This unit
Intoxications can severely debilitate animals	Need for euthanasia	13
Intoxications can cause disease in livestock	Threat to the well-being of animals	14
Intoxications that are a threat to human and animal life are of public concern	Public concern	15

## Carcass Disposal

Carcass disposal is a relatively common problem in many disasters.

- The following examples illustrate disasters in which large numbers of carcasses needed to be disposed.
- In the heat wave of 1995 in Iowa, 10,000 cattle died in feedlots. To avoid rapid decomposition in the severe heat, carcasses had to be disposed of quickly.
- In the blizzards of 1996 in South Dakota, approximately 93,000 cattle died and required disposal. Carcasses were spread out over several thousand square miles, which presented considerable logistical challenges.
- Following an acute poisoning in 1997, more than 400 cattle carcasses needed to be disposed of from a single California dairy. There were grave concerns over the potential contamination of the human food supply.
- In 1998, the Accelerated Pseudorabies Eradication Program resulted in the euthanasia of nearly 1 million pigs in several Midwestern states. The program was greatly delayed because regional rendering capacity was overwhelmed.
- In Hurricane Floyd in North Carolina in 1999, 28,000 hogs drowned. Operational delays led to a considerable increase in the cost of disposal.
- In 2000 in Georgia, a tornado destroyed several poultry barns necessitating the immediate disposal of more than 900 tons of chicken carcasses and bedding.

A situation in which a huge number of carcasses would need to be disposed of is the introduction of a Foreign Animal Disease. Examples of Foreign Animal Diseases that are a great threat to the U.S. include Classical Swine Fever (hog cholera) and Foot and Mouth Disease. If a Foreign Animal Disease were to infect U.S. livestock, disease control programs would likely result in the need to destroy many animals humanely and to dispose of tens to hundreds of thousands of carcasses.

There are many other causes of mass mortality in animals. Many of the hazards that precipitate death in livestock are described in other units of this course.

The need for effective and efficient methods for carcass disposal has been a recurring problem in many large-scale disasters. Common issues include logistical problems, appropriate choice of methods, environmental concerns (impact on water, soil, and air), and public and animal health.

In the past, carcass disposal has been addressed in the response to disasters. In some cases the absence of a plan to dispose of carcasses has led to costly delays, haphazard choices of disposal methods, and awkward compromises in an attempt to balance cost, public health, environmental protection, and biosecurity. This lack of planning has led to greatly increased costs of response operations in previous disasters.

In some cases carcasses are disposed of similar to other disaster debris; however, it is becoming increasingly difficult to find local disposal facilities that will accept large numbers of carcasses. Therefore, farmers, producers, renderers, emergency managers, veterinarians, extension agents, and others should spend time planning for large-scale carcass disposal. It is very important to develop these plans at the local level, because of the individuality of issues that arise in each community.

## **Special concerns**

There are a number of special concerns that arise surrounding the disposal of carcasses. These include public health, animal health, and environmental concerns.

### **Public health**

Dead animals are a threat to public health because of intolerable odors and the potential spread of diseases such as Salmonellosis, Campylobacter, *Clostridium perfringens*, and other zoonotic diseases. If poisoning is the cause of death, consideration also needs to be given to the risk of human exposure to the toxin involved.

### **Animal health**

Dead animals are a threat to living animals. Although they do pose threats to humans, carcasses are more likely to be infected with diseases that can harm other animals on the farm. Therefore, special attention must also be paid to implementing effective biosecurity of farms when disposing of carcasses.

### **Season**

Large numbers of carcasses present additional problems at certain times of the year. For example, they will rapidly decompose in the summer.

In winter months, snow and ice can restrict access to the site where carcasses lie or need to be moved.

**Environment**

The environment is threatened as carcasses decompose and release large numbers of coliform, Clostridia, and other bacterial organisms. When these organisms are shed into the environment, surface and ground water can become contaminated, leading to infringements of EPA and DNR regulations. In the case of intoxications, further consideration has to be given as to whether the toxin will leach into the environment and cause more problems.

**Species affected**

In the case of sheep, special considerations are necessary. Many renderers have stopped accepting sheep carcasses because of the risk of a Transmissible Spongiform Encephalopathy (TSE) such as scrapie. This means that most sheep have to be disposed of on-site.

When large numbers of carcasses need to be disposed of on-site, special permits may be required. These permits are issued by state and county environmental protection agencies and health departments.

**Case 1:  
Intoxication**

One hot summer day a dairy farmer on a large operation in Idaho notices several milking cows unwilling to rise. Initially he thinks that they are too hot, but later that day when they still have not risen, he becomes concerned. On closer investigation he finds that although the cows appear to be alert to their surroundings, they refuse to rise. The cows die later that night.

**What would you do?**

*Given a few dead animals under these circumstances, what should the farmer be concerned about?*

The next day the farmer calls the local rendering company to collect the carcasses. The rendering truck arrives the next morning. However, an additional three cows died that night and more cows appear to be developing similar symptoms. The renderer is only able to load a few cows that day.

**What are your concerns?**

*What are some concerns about carcass disposal that have arisen?*

In the intense heat, the dead cows rapidly start to decompose. Further compounding the problem, over the next 3 days, more than 120 cows become sick and many of them die. There are many more cows than the local rendering company can handle. In the meantime the farmer continues to milk the remainder of his herd.

The veterinarian makes a tentative diagnosis of intoxication via the feed.

**What would you do?**

*What could be done to reduce further ingestion of the feed by the cows?*

Not knowing for sure the source of intoxication, the farmer decides that he should not use any of the feed ingredients on his farm until they have been determined to be safe.

To be safe the farmer asks his neighbors to sell him mixed ration for his herd. If his feed is contaminated, he may have to dispose of 700 tons of silage. Clearly, this would add to his disposal problems.

**What are your concerns?**

*What are some public health concerns that have arisen?*

Many public health concerns arose because of this situation. The decomposing carcasses smelled bad. There were also grave concerns over the potential contamination of milk (i.e., the safety of the human food supply). These concerns were justified, because the farmer had sold milk from cows fed the potentially contaminated ration before he knew of any problems. This milk had already been mixed with milk from many other farms at a large-scale processor.

It was not known if the toxins in the feed would contaminate the milk produced by these cows. If there had been a risk of human exposure to toxins via milk, a great amount of milk and milk products may have had to be discarded.

Federal and state inspection services became involved in the investigation to determine the safety of the milk from this farm. In this case it was determined that there was no risk of human exposure via milk.

**Other concerns**

This case reiterates the need to obtain feed, medication, and supplies from reputable sources.

In this case several other issues could have arisen or should have been addressed. It would have been prudent to call a practicing or official veterinarian immediately when the farmer noticed unusual or inexplicable sickness and death in his cows.

If milk is unsuitable for human or animal consumption, it is considered a biohazard and requires special methods for disposal.

## **Case 2: Intoxication in sheep**

In the spring in Illinois, a sheep farmer runs into trouble watering his sheep when a water pump fails. The farmer's alternative option for watering his 325 sheep and lambs is to use a tanker wagon. He rinses the container on the wagon and fills it with water. Because the sheep have gone without water for nearly 3 days, the sheep are thirsty and drink lots of water.

The next day he finds more than 50 sheep and lambs dead.

### **What would you do?**

*If you were faced with this situation, what would you do immediately?*

The farmer's concern is that the sheep have been poisoned and that the water he provided from the wagon is the cause. He immediately turns off the spigot and discards all remaining water. He calls his veterinarian and together they find several sheep and lambs that are depressed and have labored breathing. The veterinarian makes a tentative diagnosis of nitrate poisoning and treats the affected sheep accordingly. The source of nitrate is likely to have been residual fertilizer in the wagon used to haul water.

### **What are your concerns?**

*What are some public health concerns that arise from treating food-producing animals that were poisoned?*

Treated animals may no longer be safe for human consumption.

An additional 20 sheep and lambs die. The challenge now is to dispose of the dead sheep.

The farmer contacts a local renderer but is told that because sheep may have scrapie, which is a Transmissible Spongiform Encephalopathy (TSEs), and related to BSE ("Mad Cow Disease"), that the renderer will not collect sheep any more.

### **What would you do?**

*What are alternative methods for disposal of carcasses with a potential public health or economic impact?*

The farmer consults with his veterinarian and is advised to contact the state veterinarian's office. The state veterinarian contacts the state's environmental protection agency and between them they decide on a mutually agreeable plan for disposal.

## **Mitigation for carcass disposal**

Most livestock farms deal with a low level of mortality by contracting with local rendering companies. Poultry are not rendered, and poultry farms frequently use composting to dispose of carcasses.

However, in the case of a sudden large-scale mortality, the methods used to deal with low levels of animal mortality can be overwhelmed, leading to the need for alternative methods of carcass disposal.

Under certain conditions, rendering facilities may not be able to process contaminated carcasses, such as sheep carcasses and carcasses of animals that have drowned. Alternative methods for carcass disposal may need to be employed. Planning should determine when the threshold for maximum existing disposal capacity is exceeded and alternative methods for disposal are needed.

In some cases, large-scale carcass disposal has been possible by obtaining exceptions to existing regulations, such as for burial and burning. Although most of these exceptions have been approved, it is preferable to identify appropriate methods for large-scale carcass disposal and to facilitate regulatory compliance before the need arises. Advance planning should prepare appropriate policies that facilitate compliance of carcass disposal methods with regulatory agencies.

Carcasses can be spread over wide geographic areas if they cannot be disposed of on-site. Therefore, carcasses may need to be transported to an appropriate location. Transportation of carcasses must avoid spillage of animal waste products and prevent the spread of disease to other animals en route. Planning should identify suitable methods for transportation, including storage, packaging, and handling of carcasses, as well as ways to monitor biosecurity.

In the past, large-scale disposal of carcasses has also been contracted to specialty firms that deal with hazardous materials disposal, such as from Superfund sites.

It cannot be emphasized enough, however, that local rendering capacity is usually limited or nonexistent. Although burial and burning are two real-life options that are frequently chosen in disasters, each locality will have its own best methods and sites for disposal of carcasses. There are many local factors that determine whether and how carcasses can be disposed of. Therefore, it is important that the sites and methods for carcass disposal are integrated into community emergency management plans.

A useful mitigation activity is to map the geography, water tables, location of farms, burial sites and rendering plants, and other factors that need to be considered as part of a community carcass disposal plan.

## Assess Your Vulnerability

<b>Intoxication</b>	
<b>Item</b>	<b>Vulnerability Score</b>
1. What measures do you have in place to mitigate potential intoxication of your livestock? 1 (none)—5 (all of those covered in this course and more)	
2. If the animals on your farm were poisoned with an unknown substance, would you be restricted from selling animals and products for human consumption? 1 (none of my animals are used for human consumption)—5 (it would restrict the sales of all animals and products for human consumption)	
3. How vulnerable is your farm to intoxications? Add 1 and 2	Enter this number on page 16-3
<b>Carcass Disposal</b>	
<b>Item</b>	<b>Vulnerability Score</b>
1. How well are you equipped to handle large-scale mortality (more than 25 percent of your livestock) on your farm? 1 (I could handle this)—5 (I would not be able to handle this at all)	
2. If you had many (more than 25 percent) of your animals die, would this disrupt your operation? 1 (not very much)—5 (it would cause severe disruption)	
3. How prepared are you to deal with carcass disposal? Add 1 and 2	Enter this number on page 16-5



### Learning Check

**Directions:** Determine if the following statements are true or false based on the material in this unit. When you have finished, check your answers on page 12-15.

1. Intoxications of livestock rations are never a threat to the human food supply.  
True or False?
2. Effective biosecurity on farms includes restricting access to feed storage bins to authorized persons only.  
True or False?
3. Retaining samples of feed allows farmers to trace potential contaminants after the feed has been consumed.  
True or False?
4. An outbreak of a Foreign Animal Disease in the U.S. would likely require the disposal of large numbers of carcasses.  
True or False?
5. The time available to dispose safely of carcasses can be shorter in cold weather.  
True or False?
6. Winter weather and livestock deaths on the range can make collection and disposal of carcasses difficult.  
True or False?



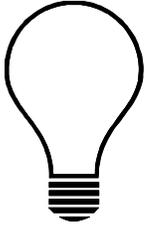
**Learning Check**

7. Large-scale mortality in livestock brings with it many logistical issues that are common to other types of disasters.  
True or False?
  
8. When an animal dies, its carcass can be a source of infection to other animals.  
True or False?
  
9. The disposal of carcasses may require the permission of the Environmental Protection Agency and Department of Natural Resources.  
True or False?
  
10. Many renderers have stopped collecting cattle carcasses because of concerns about scrapie.  
True or False?
  
11. When milk is processed, it is usually mixed with milk from many other farms.  
True or False?
  
12. Livestock that have been treated for intoxications may no longer be safe for human consumption because of the treatment given.  
True or False?



**Learning Check**

13. In the past, specialty hazardous material disposal contractors have successfully disposed of carcasses.  
True or False?
  
14. HACCP is evolving into a system to monitor the effectiveness of biosecurity and production on farms.  
True or False?
  
15. Large numbers of rotting carcasses are a potential source of ground water contamination.  
True or False?



**Answers**

For every question that you answered incorrectly, review the page listed next to the answer to find out why your answer was incorrect.

1. False.....12-2
2. True.....12-2
3. True.....12-2
4. True.....12-6
5. False.....12-8
6. True.....12-8
7. True.....12-6
8. True.....12-8
9. True.....12-8
10. False.....12-10
11. True.....12-9
12. True.....12-10
13. True.....12-10
14. True.....12-3
15. True.....12-8

## **Summary**

This unit described ways in which livestock can be intoxicated and give rise to concerns over the safety of the human food supply. This unit also discussed how you can monitor and mitigate potential poisonings on your farm. The unit also reviewed issues that arise when a large number of carcasses need to be disposed.