



AUSVET

Guidelines  
for Biosecurity SOP Development  
for Ruminant Slaughterhouses in  
Indonesia

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# Introduction

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Outbreaks of Foot and Mouth Disease (FMD) and Lumpy Skin Disease (LSD) have been impacting Indonesian cattle since 2022. To support the prevention and control of these outbreaks within Indonesia's beef supply chain, Ausvet and Meat & Livestock Australia (MLA) have been delivering the Indonesia Biosecurity Support Project. Part of this project is the provision of technical materials so ruminant businesses can protect themselves from disease. The best practice approaches discussed within these technical materials aim to maintain the productivity and profitability in intensive livestock facilities. Many of these are already available on Ausvet's website.

These guidelines are prepared to assist ruminant slaughterhouses (Rumah Potong Hewan or RPH) in Indonesia to develop their own effective Biosecurity Standard Operating Procedures (SOPs) to prevent the entry and spread of FMD and LSD. Strict biosecurity implementation is key to protecting livestock businesses and supporting the sustainability of Indonesia's beef supply chain.

# Abbreviations and Acronyms

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| Abbreviation | Definition                    |
|--------------|-------------------------------|
| FMD          | Foot and Mouth Disease        |
| LSD          | Lumpy Skin Disease            |
| PPE          | Personal Protective Equipment |
| RPH          | Rumah Potong Hewan (ID)       |
| SOP          | Standard Operating Procedure  |

# Introduction

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## Overview of Diseases

### Foot and Mouth Disease (FMD)

Foot and Mouth Disease (FMD) is characterised by painful vesicular (blistering) disease in all cloven-hoofed mammal species. This includes domestic and wild cattle, buffalo, sheep, goats, and pigs. The FMD virus is generally associated with high morbidity (spread easily) and low mortality (limited fatalities). The virus results in production losses, stunted growth, reduced milk yield, abortions, and occasionally death in young animals. FMD is not considered a public health risk.

**Transmission routes:** The virus spreads through direct contact with infected animals and indirect contact, such as through aerosols (air), equipment, people (clothes, shoes), feed, and contaminated materials. FMD virus is highly contagious. When it infects a naive herd, nearly 100% of the animals in that herd will become infected (e.g, high morbidity). Fluid in blisters caused by FMD contains the most virus, making it one of the largest sources of transmission. Actively infected animals will also excrete virus through urine, faeces, semen, eye and nasal discharge, blood, and breath. The FMD virus can survive in infected faecal waste for three weeks at room temperature.

**Clinical signs and progression:** Acute clinical signs include depression, anorexia, pyrexia ~40 degrees (1-2 days), and excessive saliva/nasal discharge. Definitive clinical signs can include vesicles in the mouth, feet, and teats. Oral lesions rupture within 1-2 days of appearance, leaving shallow erosions (ulcers). Reports from several facilities in Indonesia indicate that heavier cattle (+600 kg) suffer the most severe foot lesions, with some experiencing hoof detachment requiring slaughter.

### Lumpy Skin Disease (LSD)

The LSD virus (LSDV) is not typically associated with high morbidity like FMD, but it can cause significant impacts on the health and welfare of infected animals. In a retrospective analysis of LSD outbreaks, overall morbidity ranged from 9.11-12.3% of the herd, and mortality from 0.51-6.4% in affected farms (Al-Salihi & Hassan, 2015; Şevik & Doğan, 2017). Disease may be more severe and herd morbidity greater in cattle that have not been previously exposed, such as cattle imported from Australia. LSD is not transmissible to humans.

**Transmission routes:** LSD transmission primarily occurs through biting arthropod insects that feed on infected animals and then move to healthy ones. Potential vectors include ticks (*Rhipicephalus appendiculatus* and *Amblyomma bebraeum*), mosquitoes (*Aedes aegypti*), and stable flies (*Stomoxys calcitrans*). Indirect transmission can occur through contaminated feed and water consumed collectively if contaminated by discharge from the nose and saliva of infected animals. Transmission through infected semen is possible and is a particular concern in breeding activities. Direct transmission is a relatively ineffective route, as most transmission is believed to occur through biting insects

**Clinical signs:** Initially, infected animals discharge watery fluid from the eyes and nose, followed by high fever and characteristic skin nodules. Firm nodules 2 to 5 cm in diameter appear on infected animals.

These nodules can appear anywhere on the body, but are most often seen on the head, neck, udder, genitals, and legs. Mucosal and skin lesions will become necrotic ulcers over time. These lesions are sometimes confused with other causes of skin pathology, such as fly bites or with vaccine reactions.

## The role of Biosecurity Standard Operating Procedures

Biosecurity involves the standard practices implemented by a facility or individual to prevent the entry and spread of animal diseases. These practices are fundamental to safeguarding animal health and welfare and mitigating economic losses. Effective biosecurity requires diverse actions, ranging from managing facility access to thorough decontamination of equipment. Standard Operating Procedures (SOPs) precisely outline how a facility expects biosecurity practices to be carried out by everyone on site to achieve consistent compliance.

A comprehensive SOP should include detailed descriptions of specific biosecurity practices, such as protocols for entry/exit, animal handling, cleaning, disinfection, and waste management. It is crucial to define roles and responsibilities for each task, specify the frequency and timing of practices, and list all necessary materials and equipment, including personal protective equipment (PPE). Further, an SOP should outline training requirements for personnel, establish record-keeping procedures to track compliance, and detail emergency protocols when responding to disease outbreaks or biosecurity breaches. Regular review and revision of SOPs is vital to ensure their ongoing relevance and effectiveness.

## Record Keeping

Accurate and detailed record-keeping is essential for identifying the source of outbreaks and tracing their spread outside the facility (forward and backward tracing). Record-keeping must be integrated into every biosecurity practice discussed in these guidelines.

**Animal records:** Comprehensive record-keeping must begin as soon as animals disembark from the ship or truck. These records need to include information on animal origin, health events during transport, and any treatments given. Daily inspections in each pen, animal transfers to hospital pens, and any treatments with their clinical reasoning should also be documented. Further, all animal movement within the facility needs to be meticulously recorded. All records are linked to the animal's individual RFID and eartag, with the feedlot electronically transferring the scanned data and a physical delivery order form (which the driver carries and which becomes the abattoir's file copy) to the destination abattoir during the selling procedure. The abattoir PIC is responsible for maintaining these records. They should be stored in a secure location, such as the office or a dedicated digital database.

**People and vehicle records:** A visitor logbook and staff records that record not only entry to the facility but zones that were entered is critical. The use of QR codes can facilitate this. Additionally, vehicle traffic, especially that entering and exiting the facility, needs to be recorded, with each vehicle having a record that includes its decontamination status. The security officer or front desk staff is responsible for logging all visitors and vehicles. These logbooks should be kept at the main entry point, stored in the office, and regularly reviewed by the facility manager.

**Input records:** Detailed records are needed for all products brought into the facility. This is important for traceability and managing potential disease vectors. Specifically, feed, water, bedding material, and all related treatments must be recorded. Further, all adverse events, such as pest or insect contamination, should be documented. The supply chain officer is responsible for maintaining detailed records of all incoming inputs. These records should be kept in the main office and as a database.

**Environmental records:** Any disturbances to perimeter fences, including damage and maintenance, must be recorded. This is crucial for maintaining the integrity of the facility's biosecurity perimeter. All unmanaged or free-roaming animals entering the facility should be recorded, noting their entry location. Finally, any evidence indicating that feed or bedding has been infested by insects or pests must be recorded, along with the specific control methods implemented. The maintenance or facility manager is responsible for documenting all perimeter and environmental observations. These records can be kept in a maintenance logbook or a digital system.

# Writing Biosecurity Standard Operating Procedures

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Ruminant slaughterhouses have unique needs in preventing and managing animals affected by FMD or LSD when compared with farms and feedlots. Ruminant slaughterhouses are critical points in the supply chain that can become centers for disease spread if not properly managed and also play a role in depopulation during disease outbreaks.

The most effective biosecurity practice to reduce the probability of disease transmission in ruminant slaughterhouses is to minimise lairage to less than three days. If animals are slaughtered as soon as possible, viruses such as LSD and FMD do not have enough time to incubate and replicate within hosts on the site, preventing effective transmission of disease.

In addition to this, ruminant slaughterhouses should have a series of SOPs to reduce the probability of disease entering and spreading within the facility and to prevent virus from the facility contaminating animals and premises outside the ruminant slaughterhouse.

Table 1 summarises the SOPs that should be considered for ruminant slaughterhouses

**Table 1. SOPs for Ruminant slaughterhouses**

| Component                                                                                                                        | Priority |
|----------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Structural and geographical elements</b>                                                                                      |          |
| Facility layout map                                                                                                              | ***      |
| Biosecurity zoning SOP                                                                                                           | **       |
| <b>Livestock and product management</b>                                                                                          |          |
| <b>Carcass disposal SOP including</b>                                                                                            | ***      |
| Guidelines for chosen disposal method (burial, incineration/cremation, composting)                                               | ***      |
| Management of carcasses unfit for human consumption                                                                              | ***      |
| Animal waste and manure management SOP                                                                                           | ***      |
| Maintenance of a secure disposal site to prevent wild or free-roaming animals                                                    | ***      |
| Movement protocols to reduce contamination risk                                                                                  | **       |
| <b>People, vehicles and equipment</b>                                                                                            |          |
| <b>Personnel hygiene SOP:</b>                                                                                                    | ***      |
| Training on biosecurity principles and personal hygiene.                                                                         | ***      |
| Requirements for personal protective equipment (PPE) for different zones/tasks (e.g., boots, overalls, gloves, masks, hairnets). | **       |
| SOPs for changing into/out of PPE and its proper disposal or disinfection.                                                       | **       |
| Handwashing protocols (location, frequency, technique, hand sanitizers).                                                         | **       |
| <b>Vehicle entry/exit SOP:</b>                                                                                                   | ***      |

|                                                                                                                                                                                                        |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Protocols for cleaning and disinfection of all vehicles entering and exiting the facility (e.g., live animal transport, product delivery).                                                             | **  |
| Designated vehicle washing/disinfection bays.                                                                                                                                                          | **  |
| Logbook for vehicle movements.                                                                                                                                                                         | **  |
| <b>Equipment cleaning and disinfection SOP:</b>                                                                                                                                                        | *** |
| Detailed procedures for cleaning, sanitizing, and disinfecting all equipment that comes into contact with animals or products (e.g., stunning guns, knives, saws, hooks, conveyors, cutting surfaces). | *** |
| Designated cleaning areas and equipment.                                                                                                                                                               | **  |
| SOPs for maintenance and storage of cleaned equipment.                                                                                                                                                 | **  |
| <b>Inputs (feed, water, waste etc)</b>                                                                                                                                                                 |     |
| <b>Feed management SOP:</b>                                                                                                                                                                            | **  |
| Secure storage of feed to prevent contamination by pests or other animals.                                                                                                                             | **  |
| Protocols for handling and dispensing feed to minimize spillage and waste.                                                                                                                             | **  |
| SOP for disposal of uneaten or contaminated feed.                                                                                                                                                      | **  |
| <b>Water quality management SOP:</b>                                                                                                                                                                   | **  |
| Regular testing of water sources (potable and non-potable).                                                                                                                                            | **  |
| Maintenance and cleaning of water lines and troughs.                                                                                                                                                   | **  |
| Emergency water supply procedures.                                                                                                                                                                     | **  |
| General waste management SOP (non-animal waste):                                                                                                                                                       | **  |
| Segregation of different waste types (e.g., general refuse, hazardous waste).                                                                                                                          | **  |
| Designated waste collection points and proper disposal methods.                                                                                                                                        | **  |
| Protocols for regular waste removal from the facility.                                                                                                                                                 | **  |
| <b>Pests and vector control</b>                                                                                                                                                                        |     |
| <b>Integrated Pest Management (IPM) program:</b>                                                                                                                                                       | **  |
| Regular monitoring for signs of pests (rodents, insects, birds).                                                                                                                                       | **  |
| Documentation of pest sightings and control measures                                                                                                                                                   | **  |
| <b>Vector control SOP:</b>                                                                                                                                                                             | *** |
| Measures to control vectors such as flies, mosquitoes, and ticks.                                                                                                                                      | *** |
| Elimination of breeding sites                                                                                                                                                                          | *** |
| Appropriate insecticidal treatments if necessary, following safety guidelines.                                                                                                                         | **  |
| Contract with a professional pest control service                                                                                                                                                      | **  |

\*\*\* Critical to biosecurity and must be done. \*\* High priority \* Low priority

## Structural and Geographical Elements

**Facility layout:** Ruminant slaughterhouse needs to have a clear layout plan. A map makes it easy to clearly understand the way people, animals, vehicles, products, and wastes interact on the site. The facility plan should include animal holding areas, "clean" areas (meat processing, offices/staff rooms), wastewater drainage and collection systems, truck washing facilities, stunning boxes (knocking boxes), and slaughter rooms. The facility plan can then be used to ensure each area and process is covered by a biosecurity SOP.

**Biosecurity zones:** Biosecurity Zones are established based on a facility plan to prevent the spread of disease both into and out of a site, while also adding an internal layer of protection. This requires the development of specific biosecurity SOPs that outline how different areas of the facility are classified. The core of this classification involves designating areas as either high or low biosecurity zones, with the aim of implementing measures that significantly reduce the likelihood of disease transmission, especially into high biosecurity zones. Generally, any area where live animals are present should be designated as a high biosecurity zone, given the inherent risk of disease transmission, whereas other areas like offices, can typically be considered low biosecurity zones.

**Distance:** Waste management and carcass disposal SOPs are critical to manage the Ruminant slaughterhouse's impact on its surroundings. The location of the ruminant slaughterhouse, specifically its proximity to other intensive livestock farms and surrounding residential areas, directly influences the necessity and content of these SOPs.

## Livestock and Product Management

**Animal Acceptance:** Animals need to be inspected to determine their suitability for loading and transport prior to their transportation to ruminant slaughterhouses. Animals unfit for transport must be humanely managed on-site by the feedlot or exporter. Vaccinated animals may carry disease in the absence of clinical signs. This system must include considerations for vaccination status, as symptoms may not be visible in vaccinated cattle.

**Lairage:** Animals from different areas/shipments should not be housed in lairage together if they will be held for over three days. Where practical, lairage should be limited to less than three days. The facility SOPs should take this into account.

**Animal Movement within Ruminant Slaughterhouse:** Animal movement across the site should be restricted. = ruminant slaughterhouse's receive animals from diverse sources, which increases the risk of disease transmission if movement isn't controlled. Pathways for animal movement should be designed to reduce contact and potential cross-contamination with these principles reflected in SOPs.

**Sick animals in holding pens:** Any animals displaying clinical signs of FMD or LSD should be slaughtered immediately. The facility should be fully decontaminated after the last sick animal is slaughtered and before any new animals are scheduled to arrive.

**Carcass and waste disposal:** Comprehensive SOPs are required for managing dead animals and waste. Carcass disposal primarily involves burial, burning, or composting, with site selection requiring consideration of factors such proximity to pens and capacity to be secured by fencing to prevent access by wildlife or free-roaming animals. Since burning cattle carcasses is impractical due to their high water content and massive energy requirement, an alternative solution should be identified in advance for sites unlikely to safely manage large numbers of carcasses, especially during an outbreak. Timely disposal is critical to prevent the spread of disease from the dead animals; consequently, any wastewater used for cleaning must be kept away from stock, not recycled for watering, and prevented from draining or leaching into surrounding areas or neighbouring villages. Similarly, water containing disinfectants must not

contaminate water sources or crops, as excessive disinfectant can also inhibit or halt the composting of manure.

## People, Vehicles, and Equipment

**Entry/Exit Points:** The facility should be designed to monitor incoming vehicle traffic and prevent unauthorised access. The design should include a designated parking area for staff and visitors at the facility's entrance, strategically located away from animal pens to minimise contamination risks. These practices should be reflected in SOPs.

**Vehicles:** Vehicles can be a significant source of disease transmission. Only vehicles that absolutely must enter the ruminant slaughterhouse should be allowed entry, with "external" vehicles strictly prohibited from entering the ruminant slaughterhouse pen area. External vehicles should only be allowed access to receiving pens, feed storage, or manure storage. Further, wheels and the underside of any external vehicles that enter must be thoroughly inspected and cleaned of all organic material, including plant material and mud, and disinfected before entry if necessary. for further details please see:

<https://www.ausvet.com.au/wp-content/uploads/2023/02/Correct-decontamination-EN.pdf>.

**Staff and Visitors:** People can carry pathogens on their shoes and clothes, even without being susceptible to the disease themselves. SOPs must include requirements for recording and risk assessing anyone entering the facility, with non-staff individuals logged in a visitor logbook. Once permitted entry, new staff and visitors must undergo a detailed biosecurity induction explaining low and high biosecurity zones and appropriate movement between them. Further, everyone entering the facility needs to wear clean clothing, such as work clothes and boots, which are to be removed after work hours or visits and washed on-site if possible.

**Equipment:** Equipment should not move between different biosecurity zones. Color-coding equipment can be helpful in implementing this. When equipment must move, it should be appropriately decontaminated, highlighting that disinfection without [decontamination](#) is ineffective. This is because disinfectants only kill surface pathogens, meaning pathogens inside organic material would remain viable and pose a risk of transmission to other animals.

## Input Management (Feed, Water)

**Feed:** Feed can be a source of disease transmission. Feed should be sourced from reliable and safe suppliers who can provide proof of a biosecurity plan that is being implemented also be stored in a secure location to prevent contamination. If lairage is short, feeding can be avoided.

**Water:** Water, if contaminated, can be a major source of disease transmission. It's crucial that water for animals comes from a clean source, meaning it's free from contaminants such as bird or other animal feces, leaves, or mud.

## Pest and Vector Control

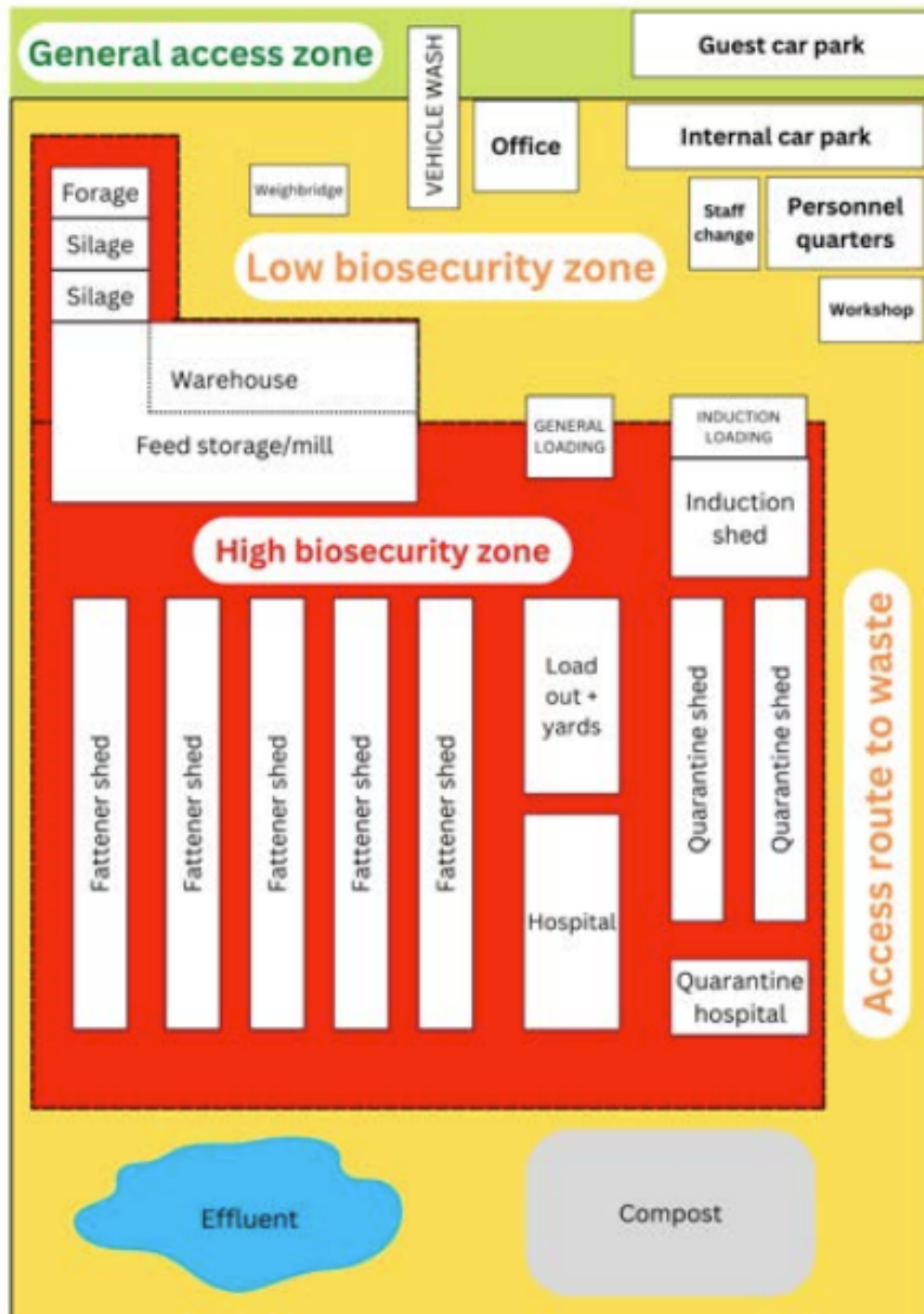
A comprehensive Integrated Pest Management (IPM) program is needed, encompassing environmental management, physical, biological, and chemical methods. This is crucial because LSD (Lumpy Skin Disease) is primarily transmitted through biting insects, and a high burden of these insect populations can also negatively impact cattle productivity. The program must include efforts to eliminate fly and mosquito breeding sites as much as possible, such as standing water, and incorporate systematic monitoring of fly populations to effectively manage risks associated with this transmission route.

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## Appendix A - Biosecurity Zoning



## Appendix B - Disinfection

<https://www.ausvet.com.au/wp-content/uploads/2023/02/Correct-decontamination-EN.pdf>

## Appendix c - Related Forms

Form-RPH-01: Ante-mortem Examination Record

| Date | Time   | Batch/Shipping No. | Origin of Livestock | Number of Livestock | No. SKKH | Clinical Symptoms (PMK/LSD) | Temperature (°C) | Status (Healthy/Sick) | Action | Inspection Officer |
|------|--------|--------------------|---------------------|---------------------|----------|-----------------------------|------------------|-----------------------|--------|--------------------|
|      | [Time] |                    | [Origin]            | [Amount]            |          | [Symptom]                   |                  |                       |        | [number]           |

Form-RPH-02: Cleaning and Disinfection Log

| Date | Area/ Equipment   | Type of Activity (Cleaning/Disinfection) | Types of Disinfectants | Concentration   | Contact Time   | Executive Officer | Signature |
|------|-------------------|------------------------------------------|------------------------|-----------------|----------------|-------------------|-----------|
|      | [Area /Equipment] | [Type of activity]                       |                        | [Concentration] | [Contact Time] | [Officer Name]    |           |

Form-RPH-03: Visitor Log

| Date | Entry Time | Visitor Name | Agency   | Purpose of Visit | Areas Visited | Exit Time | Visitor Signature | Escort Officer |
|------|------------|--------------|----------|------------------|---------------|-----------|-------------------|----------------|
|      | [Time]     | [number]     | [Agency] |                  | [Area]        | [Time]    |                   | [Officer Name] |

Form-RPH-04: Waste/Carcass Disposal Record

| Date | Type of Waste/ Carcasses | Quantity/ Weight | Origin (pen/ Area) | Disposal Method | Disposal Location | Executive Officer | Signature |
|------|--------------------------|------------------|--------------------|-----------------|-------------------|-------------------|-----------|
|      | [Type]                   | [Amount]         | [Origin]           | [Method]        | [Location]        | [Officer Name]    |           |