

# Feedlot destruction, disposal and decontamination plan

|  |  |  |
| --- | --- | --- |
| SUMMARY DETAILS | | |
| **Feedlot name:** |  | |
| **Feedlot address:** |  | |
| **Local Government Area:** |  | **Size of feedlot (hectares):** |
| **Number of livestock:** |  | **Pen sizes (individual) m2 :** |
| **Pen sizes (total) m2:** |  | **Existing carcass  management area size:** |

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# Using this template

The Destruction, Disposal and Decontamination (DDD) plan template is a plan that is unique to each feedlot and outlines the methodology and process of operationalising options for mass depopulation and disposal programs on the feedlot in the event of an Emergency Animal Disease incursion.

Lot feeders can use the [Guidance document on how to complete a Destruction, Disposal and Decontamination (DDD) plan](https://feedlottech.learnupon.com/r/wjsq7m7vnvf6yt15un3hn3tnilsrqn3) and the Carcass Disposal Optimiser to help develop a plan to help meet their obligations under the NFAS.

When used in conjunction with the Carcass Disposal Optimiser the calculator will outline the time frames required for disposal and viable disposal methods unique to the feedlot and this template will outline the resources available and required to achieve those methods.

Where this template is used as a stand-alone document, the resources section in the destruction, disposal and decontamination sections will outline reference documents that can be used to complete this plan.

For preventative measures to keep an EAD off your feedlot or to complete your [EAD action plan](https://feedlottech.learnupon.com/r/8nsx5452o4s91b69azmhjwt6ijsko33) please use the [Guidance document on how to complete an Emergency Animal Disease Action Plan.](https://feedlottech.learnupon.com/r/wjsq7m7vnvf6yt15un3hn3tnilsrqn3)

# Mapping

Include a map/s of the feedlot that includes –

* Locations of handling facilities
* Machinery access points
* Pens and laneways including pen numbers or identifiable measures
* Public roads and or vantage points
* Onsite carcass disposal area (if applicable)
* Biosecurity zones (hot and cold zones)
* Areas not viewable by the public
* Destruction areas
* Disposal sites
* Identify constraints / requirements of destruction location to facilitate effective and efficient disposal
* Areas required to be decontaminated

# Occupational work health and safety risk assessment

**Resources**

[General Guide for Managing the Risks of Cattle Handling](https://www.safeworkaustralia.gov.au/system/files/documents/1702/general-guide-cattle-handling.pdf)

|  |  |  |
| --- | --- | --- |
| Hazards | Risk | Control |
| Animal Welfare |  |  |
| Machinery | (list any risks) |  |
| Infrastructure | (conditions of pens etc) |  |
| Infrastructure | Is anything difficult to decontaminate |  |
| Infrastructure hazards for animal destruction | E.g. ricochet and steel yards |  |
| Biosecurity requirements | Bio-containment requirements where infection exists |  |
| Environmental | Bunding and effluent infrastructure |  |
| People | Licence requirements  Training requirements  Biosecurity requirements for entry / exit |  |
| Resources | Equipment required  Sundry |  |

# Destruction

The aim of any destruction technique is to achieve euthanasia in a single activity by a rapid loss of consciousness, leading to death with no return to consciousness, and with an acceptable, minimal level of stress to the animal before its death.

Carcass disposal should occur as soon as possible after the animal has been euthanised. Careful planning and management of destruction and disposal is important to ensure the safety of the community, other stock, the environment and to minimise the risk of disease spread.

## **Planning Resources**

* [AUSVETPLAN Operational Manual: Destruction of Animals](http://www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents/)
* [AUSVETPLAN Livestock welfare and management manual v3.0](https://animalhealthaustralia.com.au//wp-content/uploads/dlm_uploads/AVP_Livestock-Welfare-Mgmt_v3.0_2007-1.pdf)
* [Value and Compensation Manual](https://animalhealthaustralia.com.au/wp-content/uploads/dlm_uploads/2022/12/AUSVETPLAN_OperationalManual_VandC_V5.1.pdf)
* [Appendix 4 Destruction Planning Table](#_Appendix_4_Destruction)
* [Guidance document on how to complete a Destruction, Disposal and Decontamination (DDD) plan](https://feedlottech.learnupon.com/r/9nsom6mzx4uy5c05ck9hrot5iesym54)

Use the following table to consider processes that are required to operationalise each consideration.

|  |  |  |
| --- | --- | --- |
| Consideration | Process | Notes |
| **Suitably qualified persons** | List the persons conducting destruction activities and include any required licenses and conditions. |  |
| **Suitable trained persons** | List the persons involved in end-to-end destruction activities and include any relevant training they have received. |  |
| **Number of head to be destroyed** |  |  |
| **Time frame to be destroyed** |  |  |
| **Site selection** |  |  |
| **Which method will be used to undertake destruction activities** | Onsite  Offsite |  |
| **Onsite** | * Firearm or captive bolt frontal method * Firearm temporal method * Firearm or captive bolt in yards * Paddock or extensive area destruction * Anaesthetic agent (xylazine) * Barbiturate (calves) |  |
| **Offsite** | * Slaughter through abattoir * (list the name of the abattoir and the zoning) * (Permits and further biosecurity measures will apply to move infected livestock off the premise) | Where a feedlot cannot dispose of animals onsite enhanced biosecurity measures should be considered to allow for movement off the feedlot during an EAD response. |
| **Alternative destruction method** |  |  |
| **Welfare of animals prior to disposal** |  | State welfare requirements must be upheld at all times. |
| **Biosecurity requirements** |  |  |
| **Sampling requirements** |  |  |
| **Resources requirements** |  |  |
| **Likelihood of damage to property and services** |  |  |
| **Personal protective equipment** | PPE should include:  • Gloves  • Leather or rubber boots  • Clothes that cover exposed skin  • Eye protection  • A P2/P3 face mask |  |
| **Confirmation of death** |  |  |

## **Site Selection**

The factors that need to be considered in selecting a destruction site are outlined in the Guidance document on how to complete a Destruction, Disposal and Decontamination (DDD) plan.

|  |
| --- |
| **Which site / sites have been selected for destruction on the feedlot. List below** |
|  |

## Destruction Team

**Considerations**

A person killing an animal must have the relevant knowledge, skills and experience, or be under the direct supervision of a person with the relevant knowledge, skills and experience to humanely kill an animal.

In addition to experience, where firearms are being used the person killing an animal must hold the relevant licences and licence conditions to undertake the humane destruction using a firearm.

The following table includes generic roles of the tasks and resources required for destruction. The EAD and scale of the feedlot may increase the numbers required below.

|  |  |  |
| --- | --- | --- |
| Position/ task | Name | Licences / Qualifications |
| Destruction supervisor |  |  |
| Communications with disposal team |  |  |
| Daily destruction team debrief |  |  |
| Sitrep and communications with IP supervisor |  |  |
| Animal welfare manager |  |  |
| Person response for feeding and caring for animals including surveillance whilst awaiting destruction |  |  |
| Humane destruction personnel |  |  |
| Human destruction alternative |  |  |
| Death confirmation |  |  |
| Live animal handler |  |  |
| Live animal handler |  |  |
| Live animal handler alternative |  |  |
| Biological sampler |  |  |
| Sample transport |  |  |

**Are samples required to be collected from the animals prior to destruction?**

If YES, identify the veterinarian that would undertake this?

|  |
| --- |
| Does the feedlot have staff that are able to undertake destruction activities?  Yes / No |

## **Destruction Process**

|  |
| --- |
| Describe the end-to-end process for destruction including, start and finish times, equipment, facilities, number of head per day. |
| **Step 1**  **Step 2**  **Step 3** |
| **What equipment needs to be set out before destruction can begin?** |
|  |
| **What hours will destruction occur and when are break times?** |
|  |
| **What workplace health and safety considerations have been taken into consideration?** |
|  |
| **How will cattle be prioritized for destruction (order of destruction)?** |
| The order will be determined by disease control requirements, but is likely to be:   * affected animals * direct contacts * other susceptible animals, in descending order of epidemiological importance. (Disease-specific considerations may apply).   Animal welfare requirements could override disease eradication considerations.   * animals that cannot obtain feed or water, or whose shelter has been compromised, must be euthanised before better managed populations. * Sick and distressed animals may require immediate euthanasia and should be killed before healthy animals. * Unweaned stock must be euthanised in a timeframe that takes into account their nutritional requirements; young stock would normally be killed first. * Animals in parturition or late pregnancy should also be given special consideration. * Potentially dangerous animals, such as aggressive animals should be euthanised first. |
| **Will the storage capacity be sufficient to accommodate the difference between the maximum expected euthanasia (culling) rate and the maximum disposal rate?** |
| If not, avoid euthanizing (culled) animals at a rate that exceeds disposal and storage capacity. |
| **What methods to confirm death of each animal will be used and who will do this?** |
| Animals must be assessed individually and shown to have an absence of:   * respiratory movement * heartbeat * pulse * corneal reflex |
| **How many cattle will be destroyed in a day** |
|  |
| **What method and how regularly will the team communicate with the disposal team to ensure continuity between both teams** |
|  |
| **How many animals will be destroyed before carcasses are removed from the disposal area?** |
|  |
| **How will animals be removed from the destruction area?** |
|  |
| **What is the distance between the destruction and disposal areas?** |
|  |
| **What processes/clean up are required at the end of the day?** |
|  |
| **How is disposable PPE etc. collected for disposal at the end of the day?** |
|  |
| **What biosecurity practices are in place to prevent disease spread from the feedlot / between hot and cold zones?** |
|  |
| **Can the destruction area be adequately cleaned and disinfected during and/or after destruction or left destocked for the required amount of time depending on the disease?** |
|  |

## **Equipment resources required for destruction**

Complete the table below to include equipment that will be required to undertake mass destruction activities.

|  |  |  |
| --- | --- | --- |
| Item | Resources on hand | Notes |
| **Equipment** |  |  |
| Firearms |  |  |
| Ammo |  |  |
| Barbiturates |  |  |
| Veterinary supplies |  |  |
| Chains |  |  |
| **Machinery** |  |  |
| Machinery for pit design |  |  |
| Machinery for carcass movement |  |  |
| Transport truck/ tractor |  |  |
| **Infrastructure** |  |  |
| Yards/ facilities |  |  |
| Holding equipment |  |  |
|  |  |  |
| **Personal Protective Equipment** |  |  |
| Personal protective clothing |  |  |
| Personal protective equipment |  |  |

## **Progress destruction monitoring**

|  |
| --- |
| **Who is the person responsible for monitoring destruction team health and safety** |
|  |
| **What protocols have been put in place to swap destruction team in and out to give appropriate breaks** |
|  |
| **Who is the person responsible for monitoring animal welfare during destruction activities and what practices has been put in place to prevent negative animal welfare outcomes.** |
|  |
| **How are changed made to destruction planning and who is responsible for communicating the changes** |
|  |

# Disposal

The Livestock Carcass Disposal Calculator can be utilised to outline the top 3 disposal methods that are viable options for your feedlot.

Once the calculator has outlined potential disposal methods, this plan should outline the resources required to operationalise disposal methods.

Destruction processes and time frames can heavily influence disposal processes and should be undertaken together with effective real time communication between the two teams to minimise disease spread.

## **Planning Resources**

* [Disposal AUSVETPLAN manual](https://animalhealthaustralia.com.au/download/9130)
* [AUSVETPLAN Livestock welfare and management manual v3.0](https://animalhealthaustralia.com.au//wp-content/uploads/dlm_uploads/AVP_Livestock-Welfare-Mgmt_v3.0_2007-1.pdf)
* [Agriculture, forestry and fishing | WorkSafe.qld.gov.au](https://www.worksafe.qld.gov.au/your-industry/agriculture,-forestry-and-fishing)
* [Decontamination and disposal table](#_Decontamination_and_disposal)
* Livestock Carcass Disposal Calculator
* [Guidance document for completing a DDD Plan](https://feedlottech.learnupon.com/r/wjsq7m7vnvf6yt15un3hn3tnilsrqn3)

## **Key considerations for disposal:**

The following considerations

* The epidemiology of the EAD
* Types of materials require to be disposed of
* Feral animal management
* The size of the property
* Local considerations
* The availability of resources (human, equipment, machinery)
* Biomass required to be disposed of
* The availability of resources for selected disposal method
* Environmental considerations
* Legislative requirements and or restrictions
* Suitability of the site for the chosen disposal method
* Effectiveness of disposal method
* Recovery and or restocking plans
* Method being used
* Logistics of disposal (including machinery access)
* Resources available for disposal methods
* Welfare and safety of people
* Biosecurity requirements
* Personal protective equipment
* Processes for storage where the EAD causes mortality rates that exceed capacity of disposal

## **Site Selection**

Site selection and assessment will depend heavily on the characteristics of the EAD and its transmission. For more information the [Decontamination and Disposal Table](#_Disinfection_and_disposal) outlines disposal preferences for each EAD based on their characteristics.

The factors that need to be considered in selecting a disposal site are outlined in the Guidance document on how to complete a Destruction, Disposal and Decontamination (DDD) plan.

|  |
| --- |
| **Which site / sites have been selected for disposal on the feedlot. List below** |
|  |
| **Can wastewater and storm water runoff be controlled from the storage site?** |
|  |
| **Can the storage area be secured to prevent unauthorised access, scavengers, odours, rapid decomposition, and potential animal disease spread to susceptible species?** |
|  |
| **Can the destruction area be adequately cleaned and disinfected during and/or after destruction or left destocked for the required amount of time depending on the disease?** |
|  |
| **What safeguards will be used to protect soil and groundwater from a release of leachate?** |
|  |
|  |
|  |

## **Disposal Team**

**Considerations**

Disposal of infected materials including carcasses must be a managed end to end process to prevent the further spread of the EAD and to ensure that a feedlot can recover and restock in the shortest time frame possible.

Due to the size of cattle carcasses, it is likely that large machinery will be required to achieve disposal therefore persons undertaking disposal will require relevant licences and sufficient training to operate the machinery.

The following table includes generic roles of the tasks and resources required for disposal. The EAD, scale of the feedlot and method of disposal may increase the numbers required below.

|  |  |  |
| --- | --- | --- |
| Position/ task | Name | Licences / Qualifications |
| Disposal supervisor |  |  |
| Daily destruction team debrief |  |  |
| Sitrep and communications with IP supervisor |  |  |
| Carcass handler |  |  |
| Machinery operator (moving carcasses) |  |  |
| Machinery operator – operationalising disposal |  |  |
| Equipment maintenance |  |  |
| Resources (ordering of diesel etc) |  |  |
| Other biomass handler |  |  |

## Carcass disposal methods

The disposal method for animal carcasses will heavily depend on the EAD transmission preferences and the site suitability.

Use the carcass disposal optimiser to determine the suitability of the methods below. Where a method isn’t suitable note the reasons why in the notes section.

Use the [disinfection and disposal table in the appendix 5](#_Disinfection_and_disposal) to determine disposal suitability If not using the carcass disposal optimiser.

|  |  |  |
| --- | --- | --- |
| Method | Feasibility  Y/N | Notes |
| **Leave in situ** | Yes No |  |
| **Deep burial** | Yes No |  |
| **Shallow burial** | Yes No |  |
| **Commercial landfill** | Yes No |  |
| **Offsite processing including rendering** | Yes No |  |
| **Onsite processing including rendering** | Yes No |  |
| **Composting** | Yes No |  |
| **Burning** | Yes No |  |

## **Carcass Disposal Processes**

**(*describe the top 3 options in order of viability and delete which do not apply*):**

|  |
| --- |
| Leave in situ |
| **What area is allocated for carcasses to be left in situ (mark on map)** |
|  |
| **What equipment will be required to move livestock** |
|  |
| **What process will be undertaken to undertake disposal** |
| **Step 1**  **Step 2**  **Step 3** |
| **What other resources will be required for this method of disposal?** |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

|  |
| --- |
| Deep Burial |
| **What area is allocated for carcasses to be buried (mark on map)** |
|  |
| **What equipment is available to dig the burial pits and relocate carcasses into pit** |
|  |
| **What type of pits will be constructed? (refer to AUSVETPLAN Disposal Manual)** |
|  |
| **What are the pit sizes and how many pits are required to dispose of animals on the feedlot? Will pits need to be lined etc.** |
|  |
| **What process will be undertaken to undertake disposal** |
| **Step 1**  **Step 2**  **Step 3** |
| **What other resources will be required for this method of disposal?** |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

|  |
| --- |
| Shallow burial (with carbon) |
| **What area is allocated for carcasses to be buried (mark on map)** |
|  |
| **What equipment is available to dig the burial pits and relocate carcasses into pit** |
|  |
| **What carbon source is available to line the shallow pit (30cm high)?** |
|  |
| **What are the pit sizes and how many pits are required to dispose of animals on the feedlot?** |
|  |
| **What process will be undertaken to undertake disposal** |
| **STEPS:** |
| **What other resources will be required for this method of disposal?** |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

|  |
| --- |
| Commercial landfill |
| **What commercial landfills are available in the areas, include their distances from the feedlot? (the landfill must dispose of livestock) reticulated landfills are preferred. The landfill must also have equipment available to dispose of the livestock.** |
|  |
| **Is there any pre-existing agreement in place between the feedlot and the landfill to dispose of carcasses at the facility? (this is highly recommended).** |
|  |
| **What equipment is available to transport livestock carcasses to the commercial landfill.** |
|  |
| **What other resources will be required for this method of disposal?** |
|  |
| **What process will be undertaken to undertake disposal** |
| **Step 1**  Liaise with the IP site supervisor to discuss options and viability of off-site disposal. This may include obtaining any permits etc to undertake he movement.  **Step 2**  Contact the facility to ensure they agree to receive the carcasses and can dispose of the number of head to be disposed of and that the facility is appropriate for the EAD.  **Step 3**  Arrange bio-secure transport (transport that will not leak body fluids or expose people  or other animals to the carcass whilst in transit). This may include lining transport  vehicles etc.  **Step 4**  Arrange machinery to load the carcass into this transport.  **Step 5**  Manage body fluids. This may require bagging, use of a body bag or placing carcasses in spill proof containers. Disinfect any spillage that occurs.  **Step 6**  All equipment and machinery used to transport carcasses must be thoroughly cleaned and disinfected after use. |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

|  |
| --- |
| Abattoir processing |
| **Is the processing to be undertaken onsite or offsite?** |
|  |
| **If offsite list the location of the facility** |
|  |
| **Is there a pre-existing agreement or arrangement with the processing facility to undertake this method of disposal (this is highly recommended).** |
|  |
| **What equipment will be required to move livestock** |
|  |
| **What process will be undertaken to undertake disposal** |
| **Step 1**  Liaise with the IP site supervisor to discuss options and viability of off-site abattoir disposal. This may include obtaining any permits etc to undertake he movement.  **Step 2**  Make contact with the abattoir to ensure they agree to receive the animals. This includes discussing kill protocols and contingency plans to hold animals for any kill delays.  **Step 3**  Arrange transport vehicles and check loading facilities.  **Step 4**  All equipment used to transport carcasses must be thoroughly cleaned and disinfected after use. |
| **What other resources will be required for this method of disposal?** |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

|  |
| --- |
| Composting or Anerobic Digestion |
| **Notes:** Most viruses are inactivated at 55 degrees Celsius over 3 days (carcasses)  AS4454 and EPA require 5 Turns and 15 days greater than 55 degrees Celsius. |
| **What area is allocated for carcasses to be composted (mark on map)** |
|  |
| **What equipment is available to compost and relocate carcasses into composting piles** |
|  |
| **What carbon bulking agent is available for composting and how much tonnage is required to compost all mortalities?** |
|  |
| **List staff have the relevant skillsets to undertake mortality composting activities.** |
|  |
| **What is the size of the composting rows and how many rows are required to dispose of animals on the feedlot?** |
|  |
| **What process will be undertaken to undertake mortality composting** |
| **Step 1**  **Step 2**  **Step 3** |
| **What additional considerations must be considered with composting piles (future uses, movement permits etc.).** |
|  |
| **What other resources will be required for this method of disposal?** |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

|  |
| --- |
| Burning/ incineration |
| **What area is allocated for carcasses to be burned (mark on map)** |
|  |
| **Will carcasses be burned in open air or within an incinerator** |
|  |
| **What equipment is available to relocate carcasses to burning pyres/ incinerators** |
|  |
| **For open air burning have you consulted neighbours and the community about this method** |
|  |
| **What environmental considerations need to be taken into consideration?** |
|  |
| **What process will be undertaken to undertake disposal via burning** |
| **Step 1**  **Step 2**  **Step 3** |
| **How will ash and other fragments be disposed of after burning is complete?** |
|  |
| **What other resources will be required for this method of disposal?** |
|  |
| **What are the indicative costs of this disposal method?** |
|  |

## **Types of other materials to be disposed of**

Depending on the EAD, other materials may require disposal to prevent spread.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Materials | Present on feedlot | Method | Resources Required | Disposal site Location |
| PPE |  |  |  |  |
| Bedding |  |  |  |  |
| Straw |  |  |  |  |
| Feed |  |  |  |  |
| Manure |  |  |  |  |
| Effluent |  |  |  |  |
| Other |  |  |  |  |

|  |
| --- |
| What process will be undertaken to undertake disposal of other materials |
| **Step 1**  **Step 2**  **Step 3** |

## **Temporary storage / disposal of mass mortalities**

|  |
| --- |
| **In the event that the EAD causes high mortality rates what is the process for disposal?** e.g. temporary storage or utilizing additional machinery and shifts to manage mortalities. |
| **Will the storage capacity be sufficient to accommodate the difference between the maximum expected euthanasia (culling) rate and the maximum disposal rate? If not, avoid euthanizing (culled) animals at a rate that exceeds disposal and storage capacity. When maximum disposal and storage capacities are reached, curtail euthanasia (culling) until adequate capacity is available.** |
| If not, avoid euthanising (culling) animals at a rate that exceeds disposal and storage capacity. When maximum disposal and storage capacities are reached, curtail euthanasia (culling) until adequate capacity is available. |
|  |
| **Can the storage area be secured to prevent unauthorised access, scavengers, odours, rapid decomposition, and potential animal disease spread to susceptible species?** |
|  |
| **Can the storage site be adequately cleaned and disinfected during and/or after the response?** |
|  |
| **What safeguards will be used to protect soil and groundwater from a release of leachate?** |
|  |
| **Do the safeguards meet all applicable legislation and regulations?** |
|  |

## **Progress disposal monitoring:**

|  |
| --- |
| **Identify constraints / requirements of destruction location to facilitate effective and efficient disposal** |
|  |
| **What is the disposal rate per day? (this is linked to destruction)** |
|  |
| **Who is the person responsible for monitoring disposal team health and safety** |
|  |
| **How are changed made to disposal planning and who is responsible for communicating the changes** |
|  |

# Decontamination

Decontamination pre-planning is challenging where the EAD causative agent is unknown.

## **Planning resources**

* [AUSVETPLAN decontamination manual](https://animalhealthaustralia.com.au/download/1722)
* [Appendix 5 Decontamination and disposal table](#_Appendix_5_Decontamination)

## **Key considerations for decontamination**

Decontamination procedures will depend heavily on the characteristics of the EAD therefore it is important to understand the properties of the EAD and the disinfection processes that are likely to be effective, because pathogens vary greatly in their susceptibility to decontaminants. The factors that need to be considered in selecting a decontamination are outlined in the Guidance document on how to complete a Destruction, Disposal and Decontamination (DDD) plan. Specific disposal and decontamination strategies are also outlined in [Appendix 5](#_Disinfection_and_disposal).

## **Site Selection**

On known contaminated premises, the decontamination site(s) must facilitate the movement of people, vehicles, plant equipment and in some cases non-susceptible live animals (pets, livestock) onto and off the premises without becoming re-contaminated and potentially spreading the pathogen. More information for selecting a decontamination site is outlined in the Guidance document on how to complete a Destruction, Disposal and Decontamination (DDD) plan.

## **Decontamination team**

|  |  |  |
| --- | --- | --- |
| Position/ task | Name | Licences / Qualifications |
| Decontamination supervisor |  |  |
| Daily decontamination team debrief |  |  |
| Sitrep and communications with IP supervisor |  |  |
| Disinfectant mixing |  |  |
| Decontamination of equipment |  |  |
| Decontamination progress |  |  |

## **Decontamination Process**

The following considerations should be considered in depth once the EAD is known.

|  |
| --- |
| **What is the EAD (name, type, etc.)** |
|  |
| **What are the workplace health and safety considerations** |
|  |
| **Are any APVMA permits required?** |
|  |
| **What items are required to be decontaminated** |
|  |
| **What decontamination method is being used (natural or chemical)** |
| **Chemical**  **Natural decontamination**  **Non – Chemical** |
| **What is the process to undertake decontamination?**  **Disinfectant concentrations, contact times and characteristics can be found in 6.1.9 of the** [AUSVETPLAN decontamination manual](https://animalhealthaustralia.com.au/download/1722) |
| **Step 1**  **Step 2**  **Step 3** |

# Appendices

## **Appendix 1: DDD Checklist**

The following procedures form a checklist for the animal destruction team leader, and

should be followed.

|  |  |
| --- | --- |
| Step | Task |
| 1 | Consult with the infected premises (IP) site supervisor to discuss the feedlots DDD plan to establish:   * + Property layout, facilities and equipment   + The number, species and location of animals to be destroyed   + The destruction technique to be used and an alternative technique   + The timeframe for animal destruction operations.   + Disposal sites and methods   + Available resources   + Any resources that are required   + Processes for destruction, disposal and decontamination |
| 2 | Complete an occupational work health and safety risk assessment. |
| 3 | Sight and take a copy of any relevant firearm licences and conditions |
| 4 | Provide the IP site supervisor with the Feedlots written Destruction, Disposal and Decontamination plan for approval. |
| 5 | Consider any necessary actions to limit possible environmental impacts of the operation. |
| 6 | Consider closing airspace, especially if shooting. Contact the Civil Aviation Safety Authority to issue a ’Notice to Airmen’ (NOTAM). |
| 7 | Confirm that the site supervisor has a complete inventory of all animals on the property that are to be destroyed. Destruction should not be delayed because there has been no agreement on valuation. However, where possible, all animals should be valued before destruction. |
| 8 | Ensure that animals not to be destroyed, including domestic pets, are confined. |
| 9 | Receive a copy of destruction consent or order paperwork. |
| 10 | Complete the destruction planning table (Appendix 4) and communicate this across the three teams. |
| 11 | Brief the destruction, disposal and decontamination teams, and then supervise and coordinate their activities.  Ensure that staff are familiar with the behaviour and handling of the animals and with the destruction technique.  Ensure that all staff are qualified to operate machinery and have necessary PPE to handle animal carcasses.  Ensure that all staff have necessary training and PPE to handle chemicals and or decontamination equipment. |
| 12 | Check all destruction against the authorised inventory to ensure that all variations are accounted for (e.g. births and natural deaths) and that all susceptible animals scheduled to be destroyed on the day have been destroyed. |
| 13 | Provide the site supervisor with a situation report at the end of each day. |

## **Appendix 2: Daily destruction/disposal team(s) brief template**

|  |
| --- |
| Topics: |
| Methods  **Step 1**  **Step 2**  **Step 3** |
| Safety & Human welfare |
| Animal welfare |
| Location: |
|  |

## **Appendix 3: Safe handling of animal carcasses**

Carcasses should be handled as little as possible. Where possible, use a machine (excavator or backhoe) to handle the carcass. Appropriate personal protective equipment (PPE) should be worn when handling a carcass, especially if large amounts of dust, fumes or body fluids are produced. Any cuts or broken skin should be cleaned and covered with waterproof dressing prior to commencing disposal activities. Hand washing with soap and clean water should always be performed after contact with animals and after removing PPE.

PPE should include:

* gloves
* leather or rubber boots
* clothes that cover exposed skin
* eye protection.

Wearing a P2 mask (particulate respirator) should be considered to prevent inhalation of any aerosol risks (e.g. Q Fever). Particular attention should be paid to avoid contact with any body fluids from the dead animal.

If you feel unwell after handling carcasses contact your general practitioner.

## **Appendix 4: Destruction Planning Table**

Complete this plan using additional pages as needed. Animals should be grouped logically, by mob and destruction method.

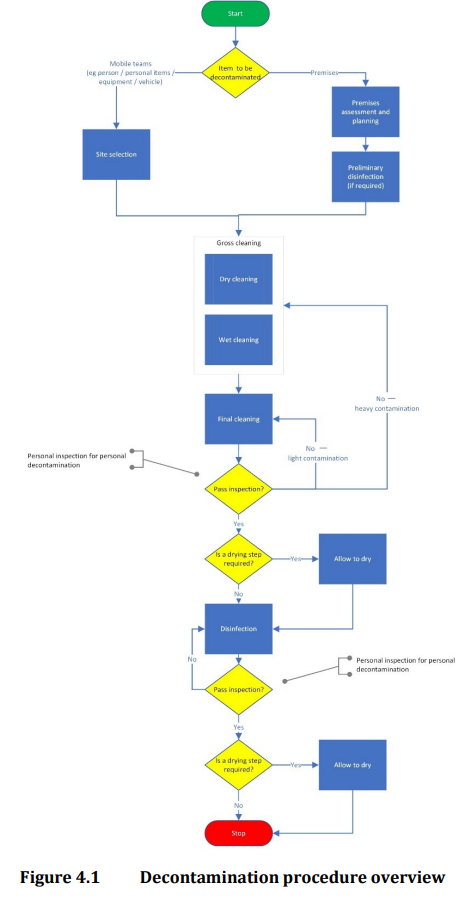
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pen Number | Number of animals | Destruction Location | Destruction Method(s) to be used | Backup Method(s) | Infected Yes/No | Comments (e.g. sample collection, additional resources required) | Priority / order | Date scheduled for | Completed |
| 1 |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |

## **Appendix 5: Decontamination and disposal table**

The following table is based on [Persistence of Disease Agents in Carcases and Animal Products](https://www.animalhealthaustralia.com.au/wp-content/uploads/Persistence_of_Disease_Agents_Report_Web_20170413.pdf) Williams March 2017)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name of disease** | **AUSVETPLAN Policy** | **Disease Agent** | **Transmission** | **Infection after death** | **Disinfection/treatment** | **Preferred disposal** |
| [African horse sickness](https://animalhealthaustralia.com.au/publication/african-horse-sickness-ausvetplan-response-strategy/)  Listed Disease Phytosanitary Measures (SPS Agreement) | Eradication | Virus (C) | Vector Borne | Nil -The relative acid lability of the virus suggests that it would be inactivated by the pH changes accompanying rigor mortis. | AHSV is inactivated by:   * formalin (0.1%) for 48 hours * beta-propiolactone (0.4%) and binary ethyleneimine. * acetic acid (2%), potassium peroxymonosulfate/sodium chloride-VirkonS® (1%) * sodium hypochlorite (3%) | Carcasses and other materials from IPs should be disposed of in a manner that will prevent access to infectious material by scavenger animals. |
| [Anthrax](https://animalhealthaustralia.com.au/download/2394) (major outbreaks)  Zoonotic  [Present in Australia](https://namp.animalhealthaustralia.com.au/public.php?page=pub_home&program=2) | Control | Bacteria  *Bacillus anthracis* | Inhalation  Ingestion  Contact | All parts of the carcass and associated secretions are likely to be infective | Anthrax spores are generally resistant to alcohols, phenols, quaternary ammonium compounds, ionic or non-ionic surfactants, acids and alkalis | On site burning and burial of the ashes. Burial sites need to be permanently identified  Off-site burial – carcasses to be wrapped and sealed for transport.  Leaving animal in situ (intact) to putrefy after treating the carcass with 3.7% formaldehyde.  The NLIS tag if present must be recorded before incineration |
| [Aujeszky’s disease](https://animalhealthaustralia.com.au/download/9176) | Eradicate -Stamping out | Virus (A) | Contact  Inhalation  Fomites | Possibly carcass and faeces / secretions. | ADV is inactivated by most disinfectants, including;  Sodium hypochlorite 0.5% (seconds), phenolic derivatives 3% (10 minutes),  Formaldehyde 0.6% (within one hour),  Lipid solvents such as ethyl ether, acetone, chloroform, and alcohol. I | Carcasses and other materials from IPs should be disposed of in a manner that will prevent access to infectious material by scavenger animals. |
| Avian Influenza H5N1  (limited information available) | Eradicate -Stamping out | Virus (A) | Contact  Inhalation  Ingestion | All parts of the carcass and associated secretions are likely to be infective | HPAI virus is destroyed by both heat and lipid solvents such as detergents, as well as formalin, sodium hypochlorite, 60-95% ethanol, quaternary ammonium compounds, aldehydes, phenols, acids, povidone-iodine | On site composting achieving high heat and deep burial.  Offsite burial, incineration, composting or rendering.  Manure can be disposed of by plastic covered composting piles to achieve 45-55 degrees. |
| [Bluetongue](https://animalhealthaustralia.com.au/download/1622)  [Present in North Australia](https://namp.animalhealthaustralia.com.au/public.php?page=pub_home&program=2)  Subclinical in Cattle | Minimise economic impact and eliminate clinical disease if possible. | Virus (C) | Vector Borne  Limited Culicoides species. C Brevitarsis. | BTV does not persist in carcasses, meat products, milk, hides or faeces.  BTV may persist in semen. | BTV is readily inactivated by heat (50o C in 3 hours and 60o C in 15 minutes).  BTV is unstable below pH 6.5 and above pH 8.0.  Virus is readily inactivated by disinfectants containing acid, alkali, sodium hypochlorite and iodophors. | Since the virus does not survive in the environment or in animal products and byproducts all disposal methods can be considered. |
| Borna disease  Subclinical in horses  Zoonotic | Eradicate -Stamping out | Virus (A) | Contact with secretions | Borna virus is not thought to persist in carcasses and meat products but may persist in secretions including urine. | BDV is sensitive to lipid solvents and UV light. | Due to gaps in knowledge on the transmission of borna disease, disposal should favor burning or incineration. |
| Bovine brucellosis | Destocking, test and slaughter | Bacteria  *Brucella abortus* | Ingestion (contaminated feed or water) | Brucella abortus may survive in the environment for:  • up to eight months in aborted fetuses (in the shade)  • 2-3 months in wet soil  • 1-2 months in dry soil  • 3-4 months in faeces. | B. abortus is sensitive to heat, sunlight, and standard disinfectants, including phenolics, halogens, quaternary ammonium compounds, and aldehydes at 0.5-1.0%. | Hygienic measures should include the disposal of aborted fetuses and membranes, removal and disposal of infected animals, and disinfection of areas contaminated by aborted fetuses and membranes. Cattle carcasses may also be rendered. |
| [Bovine Spongiform encephalopathy](https://animalhealthaustralia.com.au/download/1629) (Classical)  Zoonotic | Modified stamping out | Prion (No effective treatment or vaccine) | Ingestion (Particles) | All tissues, soils and environmental matter. | The only completely effective methods is (20,000ppm) sodium hypochlorite solutions, applied for one hour.  Boiling in 1M sodium hydroxide for at least one minute  Gravity-displacement autoclaving in the presence of sodium hydroxide (e.g. 121o C for 30-60 minutes plus 1M or 2M NaOH). | Incineration or burning is preferred as per AUSVETPLAN Manual.  Deep burial of ash or carcasses mixed with caustic materials to create an alkaline environment.  Disposal sites are to be marked and recorded. |
| [Bovine tuberculosis](https://www.woah.org/en/disease/bovine-tuberculosis/) due to Mycobacterium Bovis | - | Bacteria | Contact  Ingestion  Inhalation | Carcasses and meat products, milk skin, hides, semen and embryos and faeces. | Formalin (3%), Lysol (2%), phenol (2.5%), activated chloramine (1- 3%), cresols and iodophors are effective.  Alkaline hydrolysis | Composting, Alkaline hydrolysis, deep burial in an alkaloid environment. |
| [Contagious bovine pleuropneumonia](https://www.woah.org/en/disease/contagious-bovine-pleuropneumonia/) | Eradicate - Stamping out | Bacteria  *Mycoplasma mycoides* | Ingestion  Fomite experimentally | Faeces and urine. | The organism is inactivated within 60 minutes at 50o C and within two minutes at 60o C | Disposal methods should prevent scavenger access. |
| [Contagious equine metritis](https://www.woah.org/en/disease/contagious-equine-metritis/) | Eradicate testing and treatment | Bacteria  *Taylorella equigenitalis*  No available vaccine. | Venereal  Contact | Semen/embryos. | pH below 4.5.  Ten minutes of exposure to chlorhexidine diacetate (2%) or alkyldimethylbenzylammonium chloride (10%) | Disposal methods should prevent scavenger access. |
| [Dourine](https://www.woah.org/en/disease/dourine/) | Eradicate – Stamping out | Protozoan  *Trypanosoma equiperdum* | Venereal  In utero  Fomite  Contact | Seminal fluid and genitalia mucous membranes. | Leave in situ. | Disposal methods should prevent scavenger access. |
| East coast fever (Theileria parva)  Exotic strains of Theileria | Vector Eradication | Protozoan | Vector Borne via *Rhipicephalus appendiculatus* | Vector spread only | Destocking for 18 months to kill vector or paddock treatments. | Disposal methods should prevent scavenger access. |
| Encephalitides (tick-borne) | Eradicate – treatment / vaccinate | Virus (A) | Vector Borne | Carcasses where pH is higher than 6.0.  Milk products.  Lack of references found on faeces and semen/embryos. | sensitive to pH below 6.0.  TBE is Inactivated by UV and gamma radiation and by proteases, lipid solvents and detergents, as well as by low concentrations of aldehydes, halogens, hydrogen peroxide, and beta-propiolactone | Deep burial or other rather than leave in situ due to potential for ingestion risk.  Disposal methods should prevent scavenger animal access. |
| [Epizootic lymphangitis](https://www.woah.org/en/disease/epizootic-lymphangitis/)  Zoonotic | Eradicate – Stamping out | Fungus  *Histoplasma capsulatum var farciminosum* | Contact  Fomite  Insect vectors | Little information found. | Little information found. | Incineration / burning due to limitations in literacy. |
| Equine encephalosis (EE) | Eradication – Movement Control | Virus (C) | Vector Borne | Little information found. | pH sensitive in vitro with 0.5% trypsin, or with exposure to pH 3.0 for one hour at 37o C.  The virus was totally inactivated after 5 minutes at 60o C, with “considerable loss” of infectivity at 56o C after one hour. | Incineration / burning due to limitations in literacy. |
| Equine encephalomyelitis (WEE, EEE, VEE) | Eradication – Movement Control  Possible stamping out | Virus (A) | Vector Borne | * Semen/ embryo’s | The thermal deactivation point for alphaviruses is 58 ℃ and virus half-life is 7 hours at 37℃. The virus is quickly inactivated at acidic pH levels.  These viruses are sensitive to sunlight and heat (moist or dry heat) | Incineration / burning due to limitations in literacy. |
| [Equine influenza](https://animalhealthaustralia.com.au/download/1635) | Contain and eradicate. | Virus (A) | Inhalation Contact  Fomite | Respiratory secretions | Inactivated by exposure to UV light for 30 minutes or by heating at 50o C for 30 minutes.  Quickly inactivated by; savlon, dettol, phenyl, alcohol, formalin, and potassium permanganate. 4% lysol. Antec Virkon© | Disposal methods should prevent scavenger animal access. |
| [Equine piroplasmosis](https://www.woah.org/en/disease/equine-piroplasmosis/)  Theileria Equi and Babesia caballi | Vector Eradication | Protozoan | Vector Borne  Contact (with infected blood) | Vector spread only.  Found in heart lung and kidney for up to 8 hours after death. | Destocking for 18 months to kill vector or paddock treatments. | * Disposal methods should prevent scavenger animal access. |
| [Foot-and-mouth disease](https://animalhealthaustralia.com.au/download/1641) | Eradicate- Stamping out | Virus (B) | Ingestion  Fomites  Inhalation  Contact | Carcasses, milk and milk products, skins, hides, fibres, semen, embryos, faeces. | It is inactivated at temperature > 50o C. Heating meat to minimum core temperature of 100o C for 30 minutes inactivates the virus.  FMD is inactivated by sodium hydroxide (2%), sodium carbonate (4%), citric acid (0.2%), acetic acid (2%) sodium hyperchlorite (3%) potassium peroxymonosulfate/sodium chloride (1%) and chlorine dioxide. | * Disposal methods should prevent scavenger animal access. * Burning must be completed with care to avoid airborne spread. |
| Getah virus | Eradication – Movement Control | Virus (A) | Vector Borne  Mosquitos | Wide range of tissues including lymph nodes, lungs, spleen, liver and bone marrow | The thermal deactivation point for alphaviruses is 58 ℃ and virus half-life is 7 hours at 37℃. The virus is quickly inactivated at acidic pH levels.  These viruses are sensitive to sunlight and heat (moist or dry heat)  Inactivated by exposure to UV light for 30 minutes or by heating at 50o C for 30 minutes.  Quickly inactivated by; savlon, dettol, phenyl, alcohol, formalin, and potassium permanganate. (  4% lysol. Antec Virkon© | Disposal methods should prevent scavenger animal access. |
| [Glanders](https://www.woah.org/en/disease/glanders/) | Eradication -Stamping out | Bacteria  *Burkholderia mallei* | Ingestion (of items contaminated by nasal discharged)  Fomites | Urine, saliva, tears, faeces, nasal discharges and pus of infected animals and some risk of unprocessed skins of equids. | Heating to 55o C for 10 minutes or by UV irradiation.  Susceptible to many common disinfectants such as iodine, mercuric chloride in alcohol, potassium permanganate, benzalkonium chloride (1 part per 2000), sodium hypochlorite (500 ppm of available chlorine), 70% ethanol and 2% glutaraldehyde but is 30 seconds of contact of copper surfaces. 0.35% or 0.5% of stabilised peracetic acid used at temperatures between 23-30o C. | * Disposal methods should prevent scavenger animal access. |
| [Hemorrhagic septicaemia](https://www.woah.org/en/disease/haemorrhagic-septicaemia/) | Eradication – Movement Control  And vector eradication | Bacteria Coccobacillus  Pasteurella multocida | Ingestion  Inhalation Contact | Carcasses thought to be infective for a few days after death. | 3% hydrogen peroxide is an effective disinfectant for *P. multocida* | Disposal methods should prevent scavenger animal access. |
| [Hendra virus](https://www.woah.org/en/disease/hendra-virus/)  Zoonotic | Modified stamping out | Virus (A) | Ingestion  Contact | Limited information available | Hendra virus is a lipid envelope virus susceptible outside the host to desiccation and changes in temperature.  Under natural conditions and after application of a conservative precautionary approach, contaminated areas and fomites will be considered decontaminated 10 days after the last known exposure to HeV | Disposal on-site by deep burial or composting is the preferred option. |
| [Japanese encephalitis](https://animalhealthaustralia.com.au/download/1647)  JE is present in Australia | Control | Virus (A) | Vector Borne | Japanese encephalitis virus is unstable in the environment outside of its hosts and most of its fomites are not implicated in its natural spread | JEV is susceptible to detergents and certain common disinfectants (such as 1% sodium hypochlorite, iodine and iodophors  JEV is destroyed by heating for 30 minutes at temperatures above 56℃ | Disposal methods should prevent scavenger animal access. |
| Jembrana disease | Eradication – Movement Control | Virus (A) | Contact  Vector Borne | Some organs such as spleen and milk. | sensitive to diethyl ether | Disposal methods should prevent scavenger animal access. |
| [Lumpy skin disease](https://animalhealthaustralia.com.au/download/1653) | Eradicate - Stamping out | Virus (A) | Vector Borne | : LSDV may be found in the milk of infected animals.  LSDV has shown infectivity in dried skin lesions on the animal for at least 33 days, and 18 days in scrapings from dry lesions at room temperature. | LSD Virus is susceptible to heat with inactivation at 55℃ in 2 hours, and at 65℃ in 30 minutes.  Ether (20%), chloroform, formalin (1%) and some detergents e.g. Virus is susceptible to heat with inactivation at 55℃ in 2 hours, and at 65℃ in 30 minutes.  Sodium dodecyl sulphate. LSD virus is also susceptible to phenol (2%/15 minutes), sodium hypochlorite (2-3%), iodine compounds (1:33 dilution), Virkon (2%) and quaternary ammonium compounds (0.5%). the detergent SDS, ether, and chloroform | Where possible, disposal will be by burial, burning or composting onsite. If there is a delay between destruction and disposal, methods of vector control should be sprayed with sodium hypochlorite or Virkon (for their virucidal properties), or chemicals from the pyrethroid family (to prevent insects feeding on carcasses). |
| [Peste des petits ruminants](https://animalhealthaustralia.com.au/download/1657) | Eradicate - Stamping out | Virus (A) | Contact | Lymph nodes, the presence of virus on the skin of infected animals, by either excretion or external contamination, is highly likely.  PPRV may be found in the faeces of infected animals | The virus is destroyed at temperatures of 50℃ for 60 minutes.  The virus is inactivated at pH <4.0 or >11.0  Effective disinfectant agents include alcohol, ether, and common detergents. Virus is susceptible to most disinfectants e.g. phenol, sodium hydroxide.  Halogens and alkalis are suitable for disinfecting buildings, concrete, structures, and equipment. For personal disinfection, citric acid, alcohol and iodophors are suitable. The virus is rapidly inactivated by UV light and desiccation within 4 days. | Carcasses are to be buried, composted or burned, or allowed to decompose provided that they are protected from scavengers such as dogs or feral pigs. |
| Potomac fever | Stamping out | Bacteria Neorickettsia risticii | Bacteria Neorickettsia risticii via fluke, aquatic snail or infected aquatic insect / fly | Nil | Decontamination involves managing water areas where transmission has been caused by aquatic host. | Disposal methods should prevent scavenger animal access and contain vectors as required. |
| [Rift Valley fever](https://www.woah.org/en/disease/rift-valley-fever/) | Stamping out | Virus (A) | Vector Borne  Contact with organs or fluids of infected animals | Milk and possibly tissues of infected animals. | Rapidly inactivated below pH 6.8. Virus is inactivated by lipid solvents (ether, sodium deoxycholate and chloroform) and low concentrations of formalin or calcium hypochlorite (residual chlorine should exceed 5000 ppm) | Disposal methods should prevent scavenger animal access. |
| [Rinderpest](https://animalhealthaustralia.com.au/download/1674) (Extinct) | Stamping out | Virus (A) | Inhalation | Skin hair and fibres, milk products and carcass/meant within 24 hours of death. | Rinderpest virus is sensitive to light and UV radiation and desiccation. In general alkalis, halogen and phenolic compounds are good for disinfecting buildings, floors and equipment. AUSVETPLAN stipulate personal disinfection with either citric acid, alcohol or iodophors. | Disposal methods should prevent scavenger animal access including the first 24 hours after destruction. |
| Screw worm fly | Contain and eradicate | Insect | Screw Worm Fly lays eggs in an open wound | Skin hair and fibres may hold larvae | Animals may need to be destroyed on welfare grounds, treat with insecticide to kill any SWF eggs, pupae or larvae before disposal. | Disposal methods should prevent scavenger animal access. |
| Surra  (Trypanosoma evansi) | Eradication | Protozoan  No available vaccine. | Vector Borne (biological) and Mechanical via biting flies transferring blood (husbandry instruments or ingestion of contaminated products) | Fresh carcasses, milk, semen | Once the host is dead, conditions are rapidly untenable for the parasite, and that the chance of survival in a carcass beyond 2-3 days is nil | Disposal methods should prevent scavenger animal access. |
| [Trichinellosis](https://www.woah.org/en/disease/trichinellosis/)  Zoonotic | Eradicate - Stamping out | Parasitic nematode (genus Trichinella) round worm.  No available vaccine. | Ingestion of infected meat products. | Carcasses | Survival in a carcass beyond 1 week in summer and 6 weeks in winter.  Feed sources may be required to be managed if it is suspected to be the source of infection. | Burning, incineration, composting or rendering |
| [Vesicular stomatitis](https://animalhealthaustralia.com.au/download/1708) | Eradicate- Stamping out | Virus (A)  No available vaccine. | Vector Borne black flies simuliidae, sand flies Lutzomyia and Culicoides spp.  Contact | Milk via transfer from teats, | VSV is inactivated in 2 hours at pH 4-5. It is inactivated by temperatures over 50o C | On site burial or methods that prevent scavenger animal access. |
| Wesselsbron disease | Control – Movement Control / vaccination | Virus (A) | Vector Borne  Mosquitos | Nil – vector spread | Wesselsbron disease virus has not been well characterised, but it has the properties typical of hemagglutinating flaviviruses. These are sensitivity to acidity (< pH 8.0), temperatures above 40o C, lipid solvents and detergents. | Disposal methods should prevent scavenger animal access. |

## **Appendix 6: Decontamination procedure overview, AUSVETPLAN.**



## **Appendix 7: Decontamination process**

During the decontamination process, it is important to complete the following steps:

**Gross cleaning** — as much organic material (faeces, animal feed, water, bedding etc.) as possible should be removed from the contaminated surfaces and disposed of in the appropriate manner. This will enable disinfectants to be more effective during the final decontamination step.

* The gross cleaning stage may include a preliminary disinfection step, which involves saturating the affected areas with a disinfectant known to be effective against the relevant pathogen. This will minimise the spread of the pathogen at the gross contamination stage, noting that there are some limitations to this because many disinfectants have reduced effectiveness in the presence of fat, grease and organic material.
* The gross cleaning stage may also use dry cleaning methods (i.e. ‘dusting’ — like removal of cobwebs etc.) and/or thermal methods such as hot water and steam, which are effective for cleaning cracks and crevices where pathogens are likely to linger.

**Final cleaning** — an appropriate chemical should be used to remove all residual physical evidence of gross contamination.

* Drying — a drying step may be required.
* Inspection — the final cleaning (and drying) step will be followed by an inspection step.
  + If any heavy contamination is identified, then the gross cleaning step should be
  + repeated.
  + If any light contamination is identified, then the final cleaning step should be
  + repeated.
  + If no contamination is visible, then a final disinfection step can be completed.

**Disinfection** — an appropriate chemical or method should be used to remove or inactivate EAD agents.

**Drying —** a drying step may be required, but only after the chemical has been allowed to be in contact with the surfaces for the time required to be effective.

Any structures and equipment that cannot be effectively cleaned and/or disinfected (e.g. very porous surfaces) should be disposed of or decommissioned in an approved manner.

For animal pens and other structures, the preference is to clean these without dismantling them. If this is not possible, they should be dismantled before cleaning and disinfection (if needed).

All machinery and tools used to remove carcasses, and organic material must also be cleaned and disinfected.

The inside of pipework can be cleaned effectively by the application of steam to bring the surface temperature close to 100 °C or with a ‘clean-in-place’ system with an appropriate disinfectant product, as is often used in dairy factories.

Biofilms can harbour pathogens and make decontamination difficult in some circumstances. Such films may be found on any surface including floors, walls and pipes, as well as on any material including glass, stainless steel, aluminum, plastic, rubber and wood (Butucel et al 2022). Careful attention should be given to ensuring biofilms are removed during cleaning. (AUVETPLAN Decontamination Manual).

