AUSTRALIAN VETERINARY EMERGENCY PLAN

AUSVETPLAN

Operational Procedures Manual

Disposal

Version 3.0, 2007

AUSVETPLAN is a series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.

Primary Industries Ministerial Council

This manual forms part of:

AUSVETPLAN Edition 3

This manual will be reviewed regularly. Suggestions and recommendations for amendments should be forwarded to:

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DISEASE WATCH HOTLINE

1800 675 888

The Disease Watch Hotline is a toll-free telephone number that connects callers to the relevant state or territory officer to report concerns about any potential emergency disease situation. Anyone suspecting an emergency disease outbreak should use this number to get immediate advice and assistance.

Preface

This operational manual for disposal procedures is an integral part of the **Australian Veterinary Emergency Plan**, or **AUSVETPLAN (Edition 3)**. AUSVETPLAN structures and functions are described in the **AUSVETPLAN Summary Document**.

This manual has been produced in accordance with the procedures described in the AUSVETPLAN Summary Document and in consultation with Australian national, state and territory governments and the relevant industries. This version of the manual was approved by Primary Industries Ministerial Council out-of-session at meeting 09/48 (2007).

Where text is placed in square brackets [xxx], this indicates that that aspect of the manual remains contentious or is under development; such text is not part of the official manual. The issues will be worked on by experts and relevant text included at a future date (see the reverse title page for a record of updates to this manual).

Detailed instructions for the field implementation of AUSVETPLAN are contained in the disease strategies, operational procedures manuals, management manuals and wild animal manual. Industry-specific information is given in the relevant enterprise manuals. The full list of AUSVETPLAN manuals that may need to be accessed in an emergency is:

Disease strategies
- Individual strategy for each disease
- Response policy briefs (for diseases not covered by individual manuals)

Operational procedures manuals
- Decontamination
- Destruction of animals
- Disposal
- Public relations
- Valuation and compensation

Management manuals
- Control centres management (Parts 1 and 2)
- Animal Emergency Management Information System
- Laboratory preparedness

Enterprise manuals
- Artificial breeding centres
- Dairy processing
- Feedlots
- Meat processing
- Poultry industry
- Saleyards and transport
- Veterinary practices
- Zoos

Wild animal manual
- Wild animal response strategy

Summary document

In addition, three publications are sources for some of the information about the aetiology, diagnosis, epidemiology and control of the disease and should be read in conjunction with this strategy:

- *Exotic Diseases of Animals: A Field Guide for Australian Veterinarians* by WA Geering, AJ Forman and MJ Nunn, Australian Government Publishing Service, Canberra, 1995;
- *A Manual for the Diagnosis of Screw-Worm Fly* by JP Spradbery, Australian Government Publishing Service, Canberra, 1991; and

- *OCVO 2002. Proceedings of the Screw-worm Fly Emergency Preparedness Conference,* Canberra, 12–15 November 2001. Office of the Chief Veterinary Officer, Australian Department of Agriculture, Fisheries and Forestry, Canberra, 2002.

The complete series of AUSVETPLAN documents is available on the internet at: http://www.animalhealthaustralia.com.au/

Contents

Figures

1 Introduction

The primary objective of disposal of carcases, animal products, materials and wastes is to prevent the dissemination of infection. This process is therefore an essential part of an animal disease eradication program. Disposal should be completed as soon as possible after destruction to minimise opportunities for infectious material to disperse.

While rapid disposal is of primary importance, it must be undertaken in a way that does not increase the risk of spread of the disease or adversely affect the environment or the community. Care needs to be taken to classify all waste according to its potential infectivity and then to dispose of it according to local legislative requirements.

This manual provides a decision-making framework that allows decisions on disposal methods to be weighted in the light of current legislation, operator safety, community concern, international acceptance, transport availability, industry standards, local environment, cost-effectiveness and speed of resolution. The approach allows logical, defensible and transparent disposal of waste products from an animal health emergency.

As part of preparedness planning, potential stakeholders should be identified and engaged in the planning process to identify potential waste-handling and disposal facilities and to consider the disposal options.

1.1 Predisposal issues

Carcases and other items awaiting disposal should be contained to prevent unauthorised access and to prevent domestic pets, wild animals and birds removing potentially infectious material. Intruders can include distressed animal owners, animal rights activists, local stakeholders, unauthorised media, disgruntled employees and the curious public. Control of insects and rodents should be considered if there is a risk of passive transmission to nearby susceptible species. If disposal is delayed, carcases should be thoroughly sprayed with an approved disinfectant (see the **Decontamination Manual**).

Before beginning disposal work, personnel should be fully trained and briefed. The nature of the disease and any specific hygiene requirements needed to deal with zoonotic diseases should be explained on site. The exposure of personnel to potential zoonotic infection and all site hazards must be minimised by careful consideration of all stages of the disposal process. Appropriate personal protective equipment must be supplied and worn, especially when there is any risk to humans from the organism involved or if large amounts of dust, fumes or aerosols are generated. Overall management of disposal operations is described in the **Control Centres Management Manual**, Part 1.

2 Concept of operations

2.1 Principles of decision making

The techniques used to dispose of animals, animal products and associated wastes during an emergency animal disease (EAD) outbreak must be based on sound fundamental principles.

Most importantly, the methods chosen must prevent the dissemination of infection. They must also gain international acceptance, be acceptable to the local and broader community, meet legislative requirements and industry standards, and take into account community and operator safety, the local environment and resource availability. Cost effectiveness and speed are also fundamental to the choice of method.

The strategy described in this manual allows all these principles to be considered before action is taken. It includes the selection of an expert team to review a particular field situation by following a structured decision-making process and make recommendations to the controller of the operation. The recommendations will be delivered to the controller of the local disease control centre (LDCC). This approach provides more flexible options and allows the application of the best solution at the local level, while being acceptable in the broader context of an EAD response.

Figure 1 outlines the sequence of steps to be followed. The membership of the expert team, discussed in detail below, includes experts on the EAD involved and on the local situation.

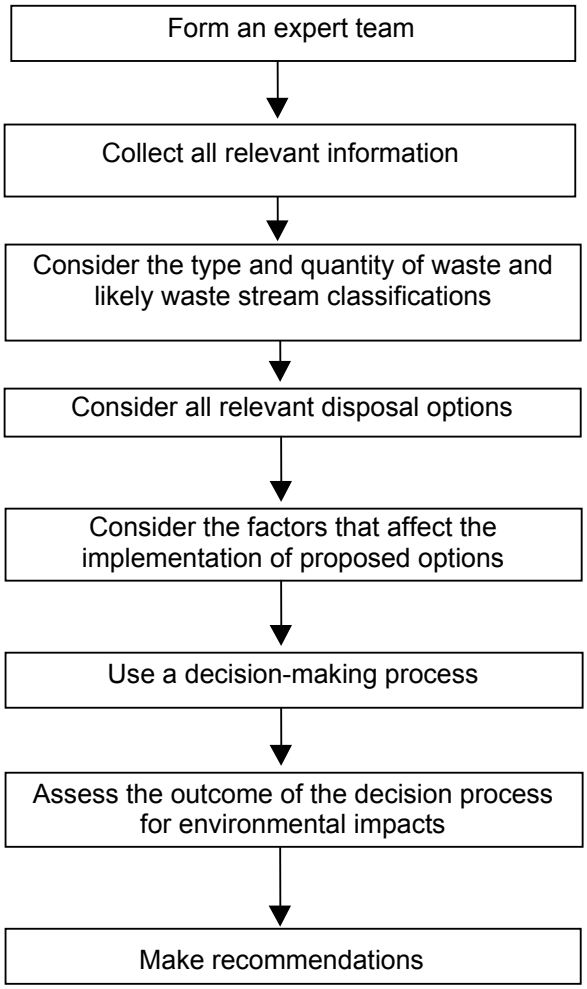


Figure 1 Process for risk assessment

2.2 Establishment of an expert team

Decisions about the classification of wastes, and transport and disposal of carcases and other potentially infective material should never be made in isolation. With the background information in hand, the EAD response manager[1] should bring together a team of relevant experts to gather the information and weigh up the factors that must be considered.

Membership of the expert team will vary with the incident and the disposal options being considered. It is important to keep the focus at the local level.

The following list provides a guide to the expertise required:

- government veterinarian;
- environmental protection authority representative;

[1] In the LDCC, this will be the disposal coordinator (LRD 203); see the **Control Centres Management Manual**, Part 2.

- civil engineer;
- infected premises operations manager;
- relevant site supervisor(s);
- industry representative(s);
- local emergency management officer(s);
- local council representative(s);
- National Parks and Wildlife representative(s);
- transport coordinator(s); and
- local health authority representative.

This team needs to be assembled quickly and give its recommendations as soon as possible. Delays in carcase disposal can result in public health concerns and increased stress to animal owners and local communities, and may reduce the options available for disposal (eg it is difficult to transport autolysed carcases).

The above list of potential members is not meant to constrain the membership of the group, but rather to give a guide to the expertise that should be consulted. One member of the team may provide a number of different areas of expertise. A smaller group of representatives may be required to efficiently undertake tasks, such as site inspections, and then report back to the whole team before recommendations are made.

Local legislation relating to the classification and disposal of waste materials must be considered and, where possible, the relevant provisions followed.

It is important that the membership of this team, the decision-making process followed and the recommendations made are documented.

2.3 Disposal considerations

The disposal of animal carcases, the materials and equipment (fomites) used in the husbandry of the animals, and the products and byproducts created by the enterprises involved, is a major concern in an EAD response.

Overseas experience (Scudamore et al 2002) has shown that the urgency of containing the disease more often than not overwhelms the ability of those working on disposal to keep up. Disposal personnel must respond in a way that is humane, takes into account the feelings of affected farmers and communities, is publicly and internationally acceptable and does not leave the community with a long-term or permanent adverse environmental inheritance.

Long-term factors, such as the maintenance, monitoring and eventual rehabilitation of the disposal sites, interact to complicate public perceptions. At the same time, the statutory requirements of local, state and national authorities must be met. The industry involved and those associated with it need to be reassured

that the disposal process has been secure. The public needs to know that food, drinking water and the environment remain safe from contamination.

Local conditions (eg position of the watertable, bushfire restrictions), available resources (eg fuel, transport) and state environmental protection legislation must be considered and may limit practical options.

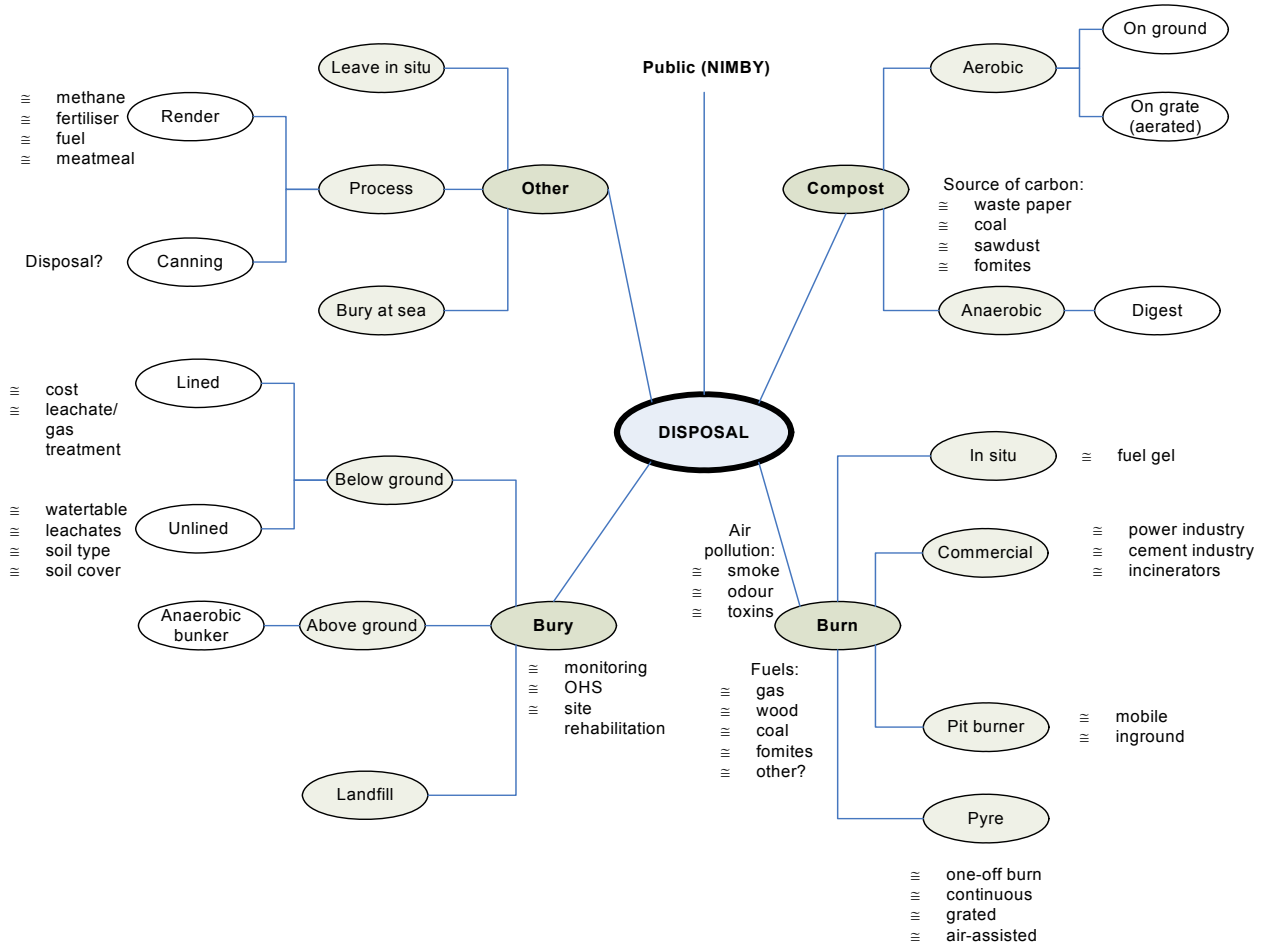
All wastes need to be considered concurrently. There may be potential for disposal of one to complement the disposal of another, as in the composting of poultry carcases and poultry litter.

Disposal cannot be considered in isolation from other factors that may determine or limit the options available at the time. Figure 2, a 'mind map', gives a schematic representation of disposal options and associated issues.

2.4 Know the disease

The epidemiology of the EAD agent will affect the choice of transport and disposal methods. In order to maintain biosecurity, it is essential to understand the mechanisms involved in the transmission of the infective agent. The ability of an agent to survive a particular disposal method will determine whether that method can be used. The AUSVETPLAN resource document *Persistence of Disease Agents in Carcases and Animal Products* (Williams 2003) should be consulted.[2] For the epidemiological characteristics of the EAD, refer to the relevant **Disease Strategy.**

[2] http://www.animalhealthaustralia.com.au/fms/Animal%20Health%20Australia/AUSVETPLAN/WilliamsReport.pdf (Accessed 24 January 2007)



Factors
Include slaughter/disposal on/off site where:
≅ on site = inside/outside control zone
≅ off site = inside/outside control zone.

Enterprise definitions?

Material treatment/processing:
≅ minced/macerated/ homogenised

Separation of wastes into solids and liquids, with further separation depending on classification of wastes.

Method of slaughter:
≅ stunned/comatose/killed
≅ animal welfare
≅ occupational health and safety

Think of product in kg of waste.

Fuel value of product

Technical/physical support from:
≅ Black Coal CRC
≅ gas industry
≅ cement industry
≅ EPA, state lands department, local government
≅ Australian Defence Force, Department of Defence
≅ mining industries

Transport.

Public health.

Seasonal conditions:
≅ fire season
≅ wet season

Geography of sites:
≅ water infiltration
≅ rock/sand
≅ water table
≅ soil type

EPA = environmental protection authority; NIMBY = not in my backyard; CRC = cooperative research centre

Figure 2 Issues to be considered in deciding options for disposal

2.5 Material type and quantity

A complete list of waste materials that may need to be transported or disposed of during an EAD response is provided in Appendix 1.

Different disease outbreaks will require different control measures, resulting in different amounts of waste. An eradication plan that requires the slaughter of all infected and at-risk animals and the decontamination and disposal of associated materials (such as for foot-and-mouth disease) would produce large amounts of waste in a short time. An outbreak of bovine spongiform encephalitis, on the other hand, would probably require disposal of fewer carcases and animal products over a prolonged period. Some intensive industries produce larger quantities of waste products than others.

Many Australian waste-management facilities process wastes similar to those that might be generated during an EAD outbreak. These facilities may be able to be used for diseases that do not generate large quantities of materials for immediate disposal. Conversely, in a large outbreak, routine waste disposal techniques may not be able to cope. This is particularly relevant for the disposal of liquid wastes such as milk. Whereas small volumes of milk can normally be treated using ultra-high temperature, large volumes may be difficult to process.

2.6 Classification of material

The waste materials that can result from an EAD outbreak are many and varied. Waste could fall under class 6.2 (infectious substances) of the Australian Dangerous Goods Code, but the classification of waste may vary from state to state. While it may be possible to bypass waste-disposal legislation if a state of emergency is enacted, it is preferable to meet the requirements of the relevant environmental legislation. In this way, short-term and long-term environmental damage will be avoided.

Classification of the waste is important, as it will help determine the method or methods of disposal that are approved. The expert team, in consultation with the relevant authorities, will classify the wastes that may arise from the EAD response.

2.7 Predisposal processing

Predisposal processing of carcases, animal parts, products and fomites in an EAD response may increase options for their transport and disposal, and could be crucial in determining the most appropriate and cost-effective methods. If the infectivity of a material can be reduced or eliminated, less restrictive methods of handling and transport may be used. It might also be possible to modify the form of the material to make it easier to handle, make alternative transport methods viable, and possibly speed up the disposal and decomposition process.

Appendix 2 gives some predisposal processing options, and their advantages and disadvantages.

Care must be taken to ensure that predisposal processing does not increase the risk of spreading the disease, result in excessive additional costs or add to occupational health and safety concerns.

2.8 Environmental considerations

Most state and territory environmental legislation focuses on protecting the environment from chemical contamination, rather than from infective contamination. While situations that may arise during EAD outbreaks have not generally been considered, it is important to work within current legislation if possible. It is important that the environmental protection agencies are actively involved in all planning and training exercises involving disposal. They are essential liaison officers in the expert team in the LDCC and state or territory disease control headquarters (SDCHQ).

Appendix 3 provides an extensive list of environmental factors that may need to be taken into account. Consideration of the list should not unduly delay disposal activities. Adequate preparation, through prior consideration of options and disposal sites, should minimise the need for detailed consideration of this list, which should be used as a prompt. Use of appropriate experts on the expert team, including those with local knowledge, will speed consideration of most items.

Postdisposal remediation is another important consideration. Some disposal methods, such as burial, cause considerable site disturbance that may be visible for some time. Long-term public risk safeguards should also be planned.

It is very important that the locations of disposal sites be documented.

Appendix 4 provides a postdisposal checklist.

2.9 Transport considerations

See Appendix 1 for a list of materials that may need to be transported in an EAD response.

The ability to transport infected, contaminated or potentially contaminated materials either within an infected premises or to other sites for decontamination or disposal may be a limiting factor in the control and eradication of an EAD.

Waste management contractors have existing vehicles suitable for transport of carcases and contaminated material. They are licensed to handle such wastes and are familiar with the occupational health and safety concerns. Care should be taken to use contractors who are able to provide the appropriate level of containment.

If transportation is needed during an EAD response, its type will depend on such interrelated factors as the infectiousness of the disease, the urgency of the operation and the cleaning and disinfection procedures required. Figure 3 shows the transport factors schematically. Appendix 5 lists some of the questions that arise when the transport of infectious material is considered.

Preparedness planning will have identified potential disposal sites and potential transport contractors. If material is to be transported, it is important that a

biosecurity plan is in place and the costs are carefully considered and approved. Before transport of material commences, it may be necessary to extend the restricted area and/or the control area. The public should be advised of what is proposed, the routes to be taken and the safeguards in place before the transportation commences.

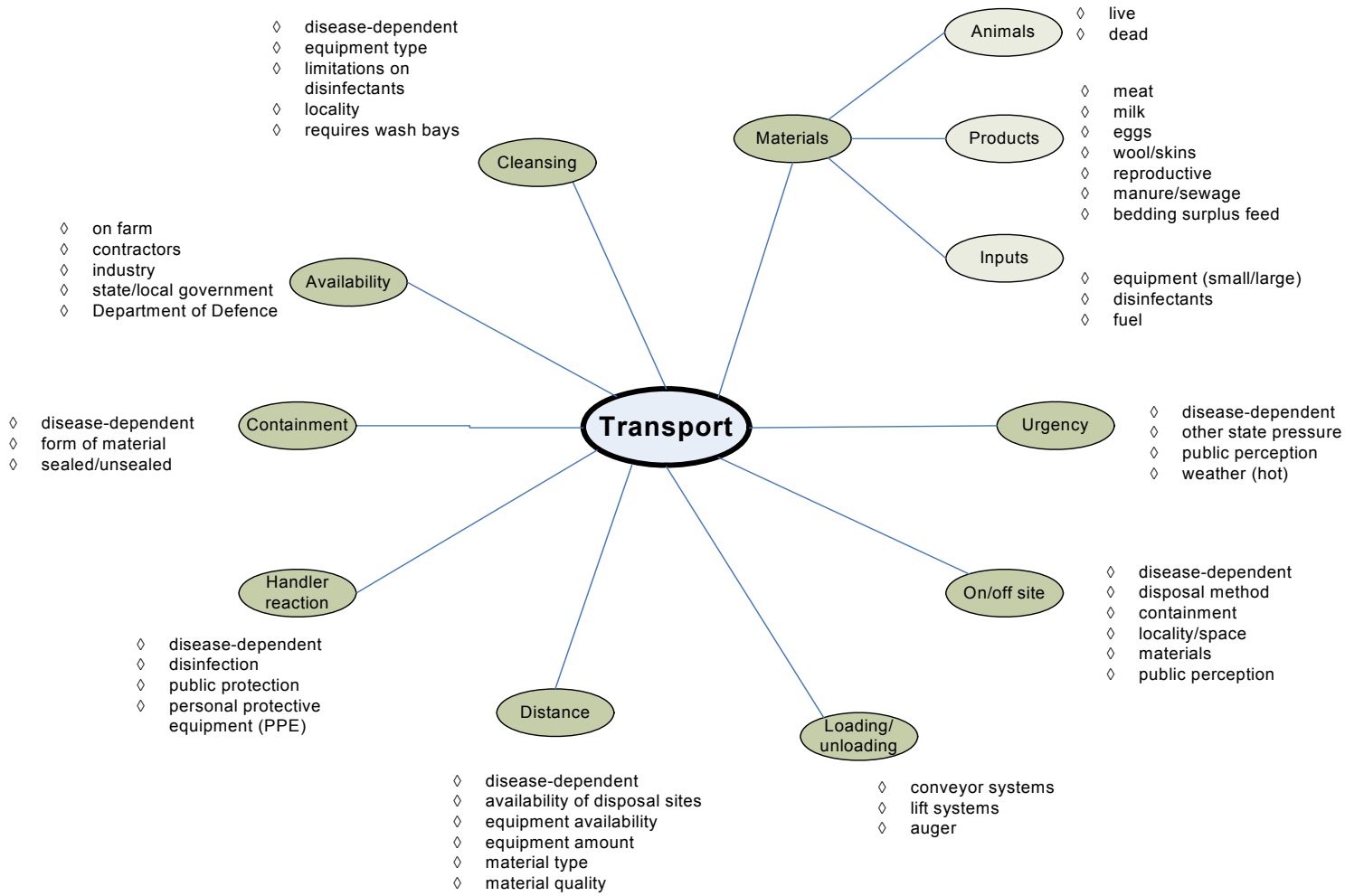


Figure 3 Issues to be considered in deciding options for transport

3 Options for carcase disposal

In an emergency animal disease (EAD) response, there are a number of methods for disposing of carcases. The most appropriate method, or combination of methods, will result from following the decision-making process outlined in Section 5. It is important that the appropriate advice is sought on environmental and engineering issues before work commences.

Much time can be saved by prior consultation with appropriate authorities, such as environmental protection agencies, to locate appropriate potential sites and to determine the basic minimum requirements for the various options available. The Animal Health Committee in 2006 has requested all jurisdictions to engage at a whole-of-government level to determine policy and implementation arrangements for identification of disposal sites (rendering, landfill, burial) and to report on a regular basis on the progress made.

Carcases may be buried (either at an existing licensed landfill site or in a specially designed and excavated pit), cremated (either on a funeral pyre or in an incinerator or pit burner), rendered or composted.

3.1 Burial

Large numbers of all classes of stock can be disposed of by burial if large areas of suitable land are available. Existing landfill sites may be available and the risks of transport of carcases to these sites may be manageable.

An advantage of burial is that, while one part of a site is under construction, another part can be filled and covered, in a continuous process that minimises exposure times.

A number of environmental, occupational health and safety (OHS) and future land use matters need to be considered before pit construction, and the appropriate authorities (such as the state/territory environmental protection agency, WorkCover and the local council) should be consulted.

The location of all burial sites should be accurately recorded.

3.1.1 Site selection

Important considerations for burial site selection include the following.

- *Access.* Access is needed for the equipment to dig the burial pit and for the delivery of livestock, carcases or other materials to be buried. There should be sufficient space for the temporary storage of overburden.

- *Environment.* Selection should take into account distance to watercourses, bores and wells; the height of the watertable; proximity to buildings, especially houses; proximity to neighbours or public lands, including roads; the slope of the land and drainage to and from the pit; the permeability of the soil; and the direction of the prevailing wind (to manage odour). Consideration may need to be given to the lining of pits and the treatment of

leachate and gas, depending on soil type, location, and the type and volume of material to be buried.

- *Construction.* Soils should be stable enough to withstand the weight of equipment used to construct and fill the pit. If necessary, surface run-off should be prevented from entering the pit by the construction of diversion banks. Similar banks should be constructed to prevent any liquids escaping from the burial site. Fencing may be necessary to exclude animals and people until the site is safe for use.

Provision will need to be made for the cleaning and decontamination of vehicles and equipment leaving the site.

3.1.2 Earthmoving equipment

The preferred equipment for digging the burial pit will depend on the design. Excavators are the most efficient equipment for the construction of long, deep, vertically sided pits, and allow the easy storage of topsoil separately from subsoil. If required, the equipment can also be used to fill the pit with carcases or other materials and to close it without disturbing the contents. Most excavators have an attachable hammer for rock work.

Loaders, bulldozers, road graders and backhoes (for small jobs) may be used if excavators are not available.

Excavators and backhoes remain in a fixed position while digging, and therefore move soil faster, with less cost and less damage to the site surrounding the pit. The other types of equipment move across the site while working.

3.1.3 Burial pit construction

The selection of the pit design should be the role of the expert team. The construction of the pit and whether it needs to be lined will rely on advice from engineers and representatives from environmental protection agencies.

The dimensions of the burial pit depend on the equipment used, the site, and the volume of material to be buried. Traditionally, a pit would have vertical sides, but safety and environmental issues have led to a rethink in pit design, with outwardly sloping (or 'battered') sides now being used (see below).

The pit should be as deep as practically possible, considering common constraints such as the reach of machinery, soil type, watertable level, and occupational health and safety. The pit should be no wider than can be filled evenly with the material to be buried using the available equipment. The aim should be to avoid having to move carcases once they are in the pit. The length of the pit will be determined by the volume of material to be buried.

When closing the pit, surplus soil should be heaped over the pit as overfill. The weight of soil acts to stop carcases rising out of the pit due to gas entrapment, prevents scavengers digging up carcases, helps filter out odours and assists in absorbing the fluids of decomposition. Surface run-off should be prevented from entering the pit by the construction of diversion banks. After pit subsidence, it will be necessary to replace any topsoil not used during pit closure.

In deciding the dimensions of the pit, consideration needs to be given to the method to be used to fill it. Usually, carcases will be unloaded (out of tip trucks) or pushed into the pit (by loader or dozer) from one of the long sides. Excavators can be used to fill pits with carcases placed close by the pit. This is especially useful if soil stability does not permit trucks or other heavy equipment to operate close to the pit edge.

Straight-sided (trench) pit dimensions

The following guidelines may help in determining the pit volume required for straight-sided pits.

The base of the pit must be at the required level above the watertable (more than 2 metres).

Volume required:

1.5 m^3 per cow
0.3 m^3 per pig or sheep

Required depth of soil to cover carcases: 2.0 metres

The number of cows or sheep that will be accommodated per linear metre of a pit 3 metres wide and 5 metres deep filled with carcases to within 2.0 metres of ground level (see Figure 4) can be calculated as shown below.

First, calculate the volume of pit available for burial per linear metre of the pit (the effective volume):

Effective volume = width × depth of carcases × length
= 3.0 m × 3.0 m × 1.0 m
= 9.0 m^3.

Then, divide by the volume required per animal:

9.0 /1.5 = 6 cattle
9.0 /0.3 = 30 sheep

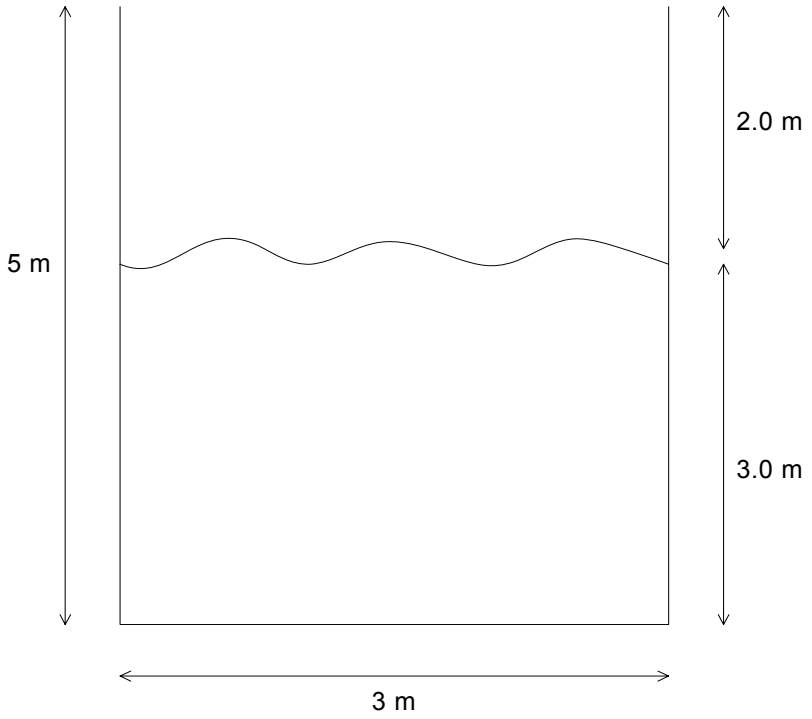


Figure 4 Example of the dimensions of a straight-sided pit

Battered pit dimensions

To overcome the OHS issues associated with straight-sided pits in some locations, such as collapsing walls, and environmental concerns about uncontained leachate, it may be necessary to use a pit with outwardly sloping (battered) sides to prevent collapse and allow for impervious liners to contain leachate. There must also be enough cover to prevent carcases from surfacing.

Volume required:

1.5 m^3 per cow
0.3 m^3 per pig or sheep

Minimum depth of pit: 5.0 m
Required depth of soil to cover carcases: 2.0 m

The number of cows and sheep that can be accommodated per linear metre of a pit 3 metres wide at the base, 5 metres wide at the top of the carcases, and 5 metres deep, filled with carcases to within 2 metres of ground level (see Figure 5) can be calculated as follows.

Because the width changes from the top to the bottom of a battered pit, the average width must be used to calculate the volume of the pit. That is:

Volume of a pit = mean width × vertical height × length

Therefore, first calculate the mean width of the effective volume:

Width at base of pit: 3.0 m
Width at top of carcases: 5.0 m
Mean width: 4.0 m

Then calculate the effective volume:

Effective volume = mean width (of effective volume) × (vertical height of carcasses) × length
= 4.0 m × (5.0 – 2.0) m × 1.0 m
= 12 m^3

Then, divide by the volume required per animal:

12 /1.5 = 8 cattle
12 /0.3 = 40 sheep

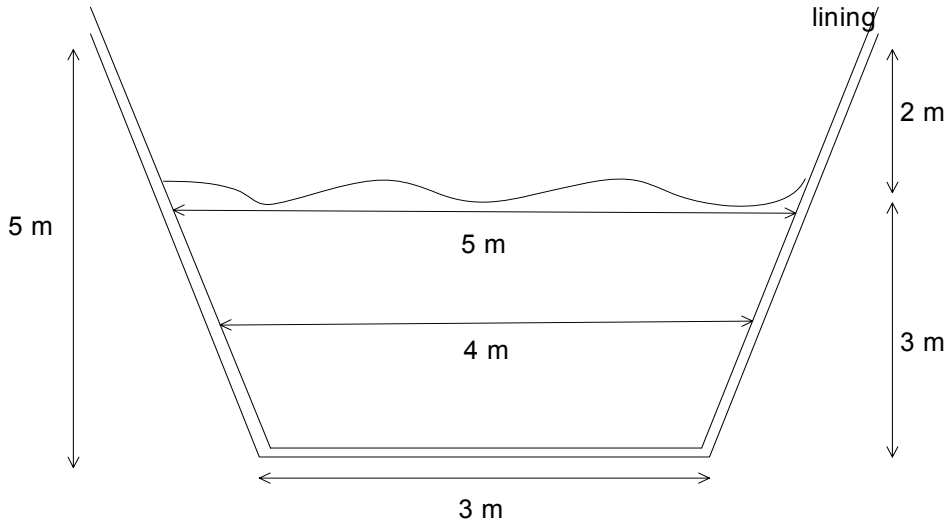


Figure 5 Example of the dimensions of a battered burial pit

3.1.4 Other considerations

Safety considerations

Safety of personnel is an overriding consideration. Aspects to consider include the hygiene of the personnel working on the site, the availability of rescue equipment if a person falls into the pit or if the pit wall collapses, and hearing and dust protection. All operations should be controlled by the site supervisor, and personnel should be properly trained and briefed before operations begin.

Leachate production

Leachate is the liquid that is released during the decomposition of wastes. It has been estimated that 50% of the available fluids would leak out of carcases within the first week following death, and nearly all fluid would drain from the carcase in the first two months. Following the outbreak of foot-and-mouth disease in the United Kingdom in 2001, it was estimated that 170 litres of fluid was released in the first two months by an adult cattle carcase, and 16 litres was released from an adult sheep carcase (UK Environment Agency 2001).

Leachate can potentially contaminate surface and groundwater supplies. Advice needs to be sought from relevant environmental protection authorities on the programs required for containment, treatment and monitoring of leachate.

Gas production

Gas production from decomposition within unopened carcases may result in considerable increase in the volume of the buried material, to the extent that the surface of the closed pit may rise and carcases and/or leachate may be expelled. However, OHS and biosecurity considerations may outweigh benefits of slashing the rumens of carcases to prevent them bloating and surfacing. Do not slash carcases before transport. A small puncture hole can be made in rumens at the side of the pit before placement of the carcase in the pit. Alternatively, attachments on excavating equipment can be used to puncture carcases when this is considered necessary. Under no circumstances should personnel enter the pit during filling. Where mass burials occur, the gas trapped under the cover of soil can be vented through pipes for treatment.

Site inspection and monitoring

Regular inspection of the burial site after closure is recommended so that appropriate action can be taken in the event of seepage or other problems. The objective is to return the site to its original condition. Before restocking is permitted, the burial site should be inspected again to ensure that there is no possible biological or physical danger to stock. This would normally be several months following pit closure.

Advice on the need for an ongoing environmental monitoring program of burial sites and the watertable will need to be obtained from the relevant environmental protection agency.

Other species — poultry and bees

If poultry are to be destroyed in an EAD outbreak, destruction will normally be in a container such as a skip or the body of a truck, and the dimensions of these containers should be used as a guide to the volume of the pit required.

For information on the disposal of bee hives, see the **Bee Pests and Diseases Strategy**.

3.1.5 Advantages and disadvantages of burial

Advantages of burial include:

- allows any number of animals of all categories to be disposed;
- it can be initiated relatively quickly;
- community acceptance;
- international acceptance; and
- minimum odour risk.

Disadvantages of burial include:

- OHS concerns;
- requirement for suitable geology/land area;

- potential risk to groundwater;
- may require ongoing site monitoring;
- leachate and gas may need to be treated;
- local community resistance;
- requirement for biosecurity for transport of animals to a site;
- impact on future use/rehabilitation of the site;
- large incidents require large equipment;
- not suitable for urban areas or near human habitation; and
- does not generate any usable byproduct.

3.1.6 Mounding

Mounding is the process of above-ground burial. It differs from composting in that it relies on anaerobic decomposition. This process involves moving enough soil to form a shallow depression in which the carcases are laid in a single layer and covered with 400–500 millimetres of soil. Surface run-off should be prevented from entering the mound by the construction of diversion banks. Care also needs to be taken to contain any leachate from the mound.

Advantages of mounding include:

- the low cost;
- the land can be reused after decomposition is complete;
- it can be initiated relatively quickly; and
- it is easy to apply.

Disadvantages of mounding include:

- complete decomposition of large carcases requires 6–12 months;
- ongoing site monitoring may be required; and
- run-off and leachate must be contained.

3.1.7 Use of existing landfill sites

Disposal of carcases and contaminated material to landfill can be an effective option for some diseases. One advantage of existing landfill sites is that they may be approved to receive animal carcases and have the necessary infrastructure to manage long-term containment issues. The potential use of existing landfill sites (public and privately owned) for an EAD response should be negotiated with the owners and relevant authorities in advance.

Advantages of landfill include:

- landfill sites may be licensed to accept animal waste;
- costs include long-term management of waste;
- on-site facilities (power, water, machinery, staff, security) are already in place;
- capacity can be large;
- environmental protection measures are already designed and implemented (eg infrastructure exists to treat leachate and gas);
- landfill sites can be geographically well spread; and
- sites may be on government land.

Disadvantages of using existing landfill sites include:

- the cost to access these facilities can be moderate to high;
- suitably approved sites may not be close to the source of the wastes to be disposed of;
- biologically secure transport to the landfill site is required;
- the process does not generate a usable byproduct;
- community objection to use of site may limit use of this option;
- current access to the site may need to be maintained, resulting in biosecurity issues; and
- the site may have populations of birds and rodents.

3.2 Burning

3.2.1 Cremation on pyres

Construction of pyres for cremation will depend on the local conditions, available fuel supplies, and the carcases or waste to be destroyed. The principle is to place carcases on top of sufficient combustible material, ensuring that the arrangement of fuel and carcases allows adequate air flow from below and thereby achieves the hottest fire and efficient combustion.

Site selection

Important considerations for siting pyres are:

- *location* – the possible effects of the heat, smoke and odour generated by the fire on nearby structures, underground and aerial utilities, roads and residential areas should be considered;
- *access to the site* – access is needed for equipment to construct the pyre and maintain the fire and for the delivery of fuel and livestock, carcases or other materials to be burnt; this may be difficult in wet weather;

- *environment* — there must be an adequate firebreak around the pyre, and local bushfire brigades should be consulted for advice, permits (if required) and fire appliances to be on site during the burn; and

- *fuel* – pyres need considerable fuel to achieve complete cremation; the amount and type of fuels available will vary considerably; all required fuel should be on site before the burn is begun.

Preparation of pyre

The fire line should be sited at 90 degrees to the direction of the prevailing wind to maximise ventilation. If natural air flow is limited, ventilation can be provided by digging trenches under the pyre.

Trench size required:

- *width* — governed by the size of carcases to be burned (for adult cattle allow 2.5 metres)
- *length* – allow 1 metre per adult beast

If the pyre is built on the ground, trenches (30 cm × 30 cm) should be dug to act as air-vent channels in the same direction as the prevailing wind at about 1 metre intervals under the length of the pyre. If the pyre is elevated, the bottom rows of heavy timbers should be laid parallel to the prevailing wind, with a gap between them equivalent to the diameter of these timbers. Another layer of timbers is laid, crossing the bottom layer at 90 degrees, with a gap of about 20 cm between timbers. This continues until the desired height is achieved. Other fuel, such as lighter timber or straw bales, is then laid over this timber support (see Figure 6).

Carcases are then stacked across the pyre, preferably on their backs, and alternating head to tail if possible. Excavators or front-end loaders are best for stacking carcases, but lifting jibs, tractor forklifts or cranes and chains can be used. After carcases are placed on the pyre, the extensor tendons may be cut to prevent legs being extended during burning, but not if this raises OHS concerns. Carcases should be stacked one row high and have sufficient air space between them. Restricting airflow around fuel and carcases will result in an inefficient burn.

When loading of the carcases is complete and weather conditions are suitable, the pyre should be saturated with a suitable hydrocarbon (such as diesel), and ignition points prepared about every 10 metres along its length. These can be made of rags soaked in hydrocarbon. Alternatively, fuelgel could be used for igniting a pyre, as it is not as volatile as liquid fuel and it allows for a more sustained burn.

All vehicles, personnel and other equipment should then be moved well away from the pyre. The person starting the fire should walk into the wind and light the ignition points along the way.

The fire must be attended at all times and be refuelled as necessary, using a tractor with a front-mounted blade or a front-end loader. Any carcases or parts that fall off the pyre should be repositioned as quickly and safely as possible. A well-constructed pyre should consume carcases within 24–48 hours.

The ashes should be buried and the site restored as well as possible.

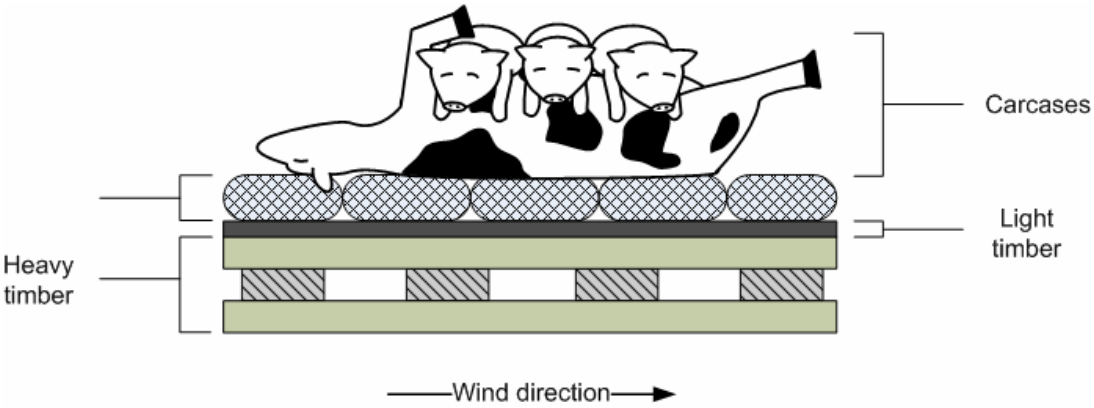


Figure 6 Example of construction of a pyre

Fuel requirements

Local availability will govern the type, quality and amount of various fuels used. Experience has demonstrated that carcases can be completely consumed using dry wood alone at the rate of 1.5 tonnes for a 500 kg adult bovine or 1.5 tonnes of coal briquettes or equivalent combinations. For multiple carcases, the amount of fuel may be reduced to 1.0 tonne per adult bovine because of economies of scale. Straw and liquid fuel are required to start the burn.

For fuel estimation, one adult cattle carcase is equivalent to four adult pigs or shorn sheep, or three woolly adult sheep.

Advantages and disadvantages of pyres

Advantages of pyres include:

- they can handle any number of animals of all categories;
- they can be initiated relatively quickly;
- each burn is completed in less than a week;
- they require only short-term site monitoring;
- low-technology option; and
- they can be used where a high watertable or unstable or rocky soil types preclude burial.

Disadvantages of pyres include:

- OHS concerns;
- building a pyre can be time consuming and labour intensive;
- time is needed to burn carcases thoroughly;
- fire risk;
- they require intensive short-term site monitoring;
- poor public perception;

- require large volumes of suitable fuel(s);
- rehabilitation of the site;
- inefficient fires may increase the risk of infectious agents spreading on rising thermal air currents, but results from studies carried out during the United Kingdom foot-and-mouth disease epidemic in 2001 indicate that this is not likely (Bourne 2001, Gloster et al 2001);
- biosecurity of transporting animals to a site;
- ash needs to be disposed of;
- public health considerations, including effect on asthma sufferers;
- smell;
- effect on air quality;
- wild animal exclusion required, at least initially; and
- incomplete combustion is possible (eg when materials are too wet to burn).

3.2.2 Incineration

Fixed incinerators

Biological incinerators are a very efficient carcase-disposal system, achieving safe and complete disposal with virtually no pollution, but they are usually suited to the disposal of only small amounts of material. Moreover, their establishment and operational costs and their lack of portability mean they are unlikely to be readily available or easily accessible in most situations. They are often located close to population centres.

If incinerators are used, special procedures must be followed in the transportation of infected material to them from infected premises, and in the disinfection of containers, vehicles and the site.

Portable incinerators

Air curtain incineration (pit burning)

Pit burning (also known as air curtain incineration) is a technique for burning material in a pit aided by fan-forced air. Pit burners are used by some local councils to burn vegetable matter with a high moisture content. The equipment consists of a large-capacity fan and ducting to deliver the air, which may be preheated, down into the long side of a trench. The angle of the airflow results in a curtain of air acting as a top for the incinerator and provides oxygen that produces high burn temperatures. Sufficient hot air recirculates within the pit to achieve complete combustion. Additional fuel is required to establish combustion, but once the system is operating the continuing fuel requirement is reduced. Pit burners would be suitable for continuous operation on a relatively small scale and have the advantage of being transportable. They appear to be especially suited for use with pigs and fat sheep.

A typical pit burner is shown in Figure 7. The sides of the trench may be battered for increased stability; however, this may affect airflow and reduce the effectiveness of the operation.

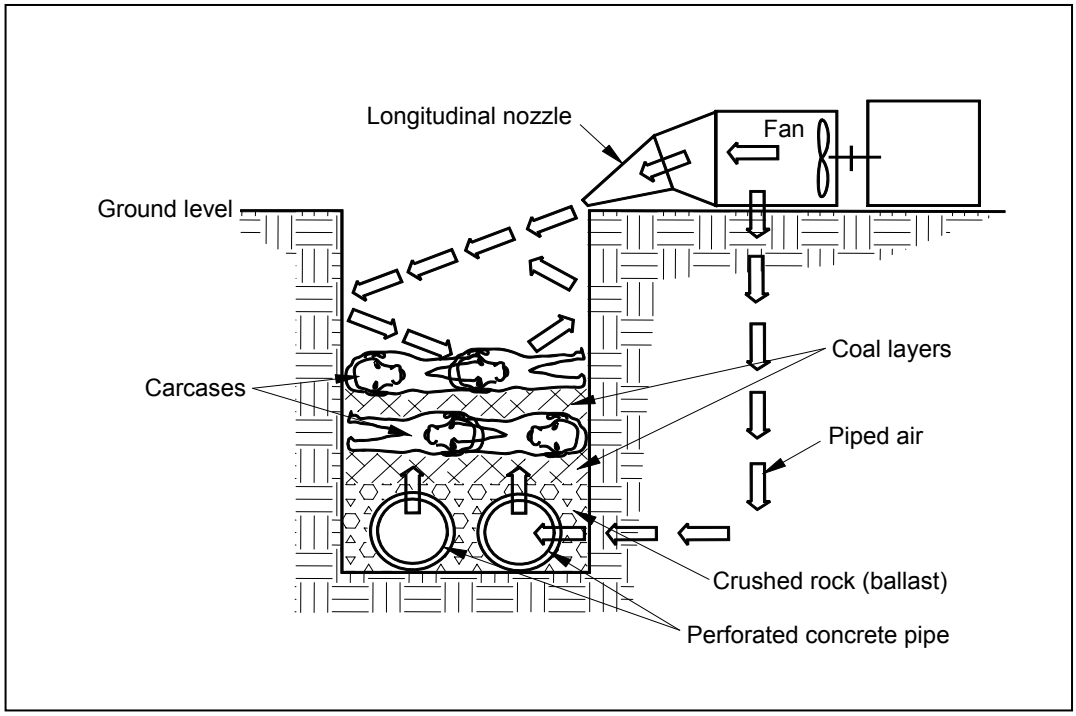


Figure 7 Typical pit burner construction (coal-fired pit arrangement)

Advantages of pit buring include:

- it can handle any number and all classes of stock;
- design allows for efficient combustion by achieving high temperatures;
- it can be initiated relatively quickly;
- requires only short-term site monitoring;
- site can be rehabilitated quickly;
- better fire control during fire season than with pyre; and
- better fuel economy than with pyre.

Disadvantages of pit burning include:

- OHS concerns;
- availability of suitable geology to construct the pit;
- requires active monitoring during operation;
- local public resistance;
- requires large volumes of suitable fuel;

- need for specialist input to operate burner;
- operation is very noisy; and
- the volume of material that can be handled is limited.

3.3 Rendering

If carcases are to be rendered, the state disease control headquarters (SDCHQ) will coordinate all arrangements for the disposal of carcases at rendering plants and will liaise with the companies concerned. When preparing for an EAD response, it is important that the location and capacity of rendering plants is documented. It would also be helpful to reach prior agreement with management on the potential use and associated costs of rendering in the event of an EAD response. Although this option is highly favoured, it is likely that capacity for rendering will be limited.

Only plants using a high-temperature batch rendering process and with adequate, biosecure separation of raw product and end product will be approved. A satisfactory rendering process would involve grinding the raw product, solvent extraction of lipids at about 100°C for one hour, and high-temperature treatment of both meatmeal and tallow for at least a further 40 minutes. See the relevant **Disease Strategy** for information on temperatures required and the Australian Standard AS 5008:2001 — *Hygienic Rendering of Animal Products*.[3]

The end product of rendering must pass relevant microbiological tests before release.

3.4 Composting

Composting is a natural process whereby beneficial microorganisms decompose and transform organic materials into a useful and biologically stable end product that is safe for the environment. The process, if carefully implemented and monitored, generates sufficient heat to destroy most pathogenic organisms.

Aerobic composting is a proven technology for disposal of animal waste and animal carcases. It has been used successfully during outbreaks of avian influenza in North America to dispose of animal carcases and animal waste. Sections of the poultry industry in Australia are using this technology for on-farm disposal of mortalities that occur under normal production circumstances.

There are a number of large-scale commercial composting operations in all states, mostly near capital cities, but community and regulatory pressures are forcing waste disposal and recycling operations further away from centres of population.

Aerobic or 'dry' composting requires the regular turning of material with a relatively low moisture content. Some operations use a grated aeration system to

[3] http://www.standards.com.au/Catalogue/script/Details.asp?DocN=AS760700670543 (Accessed 24 January 2007)

assist the process. Such systems call for specialist knowledge and large machinery to maintain the aeration process. The process also relies on large quantities of carbonaceous material, usually in the form of municipal waste or sawdust. Other suggested carbon sources include poultry litter, manure, cereal crop straw and peanut hulls. The literature suggests that if animal waste is to be composted a ratio of about 3:1 wt/wt carbonaceous material to animal waste is required.

Composting can be used to effectively dispose of animal carcases of all sizes and associated waste. However, in the case of an EAD response, composting is unlikely to be effective in disposing of large numbers of large carcasses due to the amount of carbonaceous material required, the time taken for the process to be completed and the difficulties in ensuring a uniform process. Until further information is available, composting is currently recommended only for small carcases and not for sheep with wool on them.

Existing silage pits can be used for composting animal waste and carcases.

Further information on composting can be obtained from:

- *Mortality Composting: A Review of the use of Composting for the Disposal of Dead Animals (*Wilkinson 2006)?*;* or
- *Carcass Disposal: A Comprehensive Review* (NABC 2004).[4]

3.4.1 Advantages and disadvantages of composting

Advantages include:

- could be an on-site treatment;
- commercial operators are available;
- quick response to a medium-scale incident;
- current technology;
- recycles carcases and results in a saleable product;
- will take fomites and some industry products; and
- suitable for small stock, poultry and pigs.

Disadvantages include:

- requires a large supply of carbonaceous material (eg waste paper, coal, sawdust);
- availability of equipment;
- local community resistance;

[4] http://fss.k-state.edu/research/books/carcassdispfiles/Carcass%20Disposal.html

- possibility of odour risk;
- requires good control/monitoring;
- biosecurity risk if required temperatures are not achieved;
- process takes time, and may affect release of quarantine;
- not suitable for spore-forming organisms (such as anthrax) or animals affected with transmissible spongiform encephalopathies; and
- not recommended for large carcases or sheep in wool.

3.5 Novel ideas

[xxSection still under development]

- digesters;
- autoclaves;
- industrial incinerators;
- power plants;
- cement kilns; and
- time treatment (leave in situ).

Carcass Disposal: A Comprehensive Review (NABC 2004) contains valuable additional information on these techniques.

4 Items requiring special consideration

All contaminated and potentially contaminated carcases, animal products, materials and wastes will be disposed of by one of the methods outlined in Section 3. However, specific disposal considerations apply to the materials listed below.

4.1 Milk and dairy products

[xxSection still under development]

The disposal of milk products presents particular difficulties because large volumes are often involved. Milk is very difficult to bury or treat in effluent disposal systems. It is essential that milk be treated to inactivate the disease agent before disposal (see the **Decontamination Manual**). Care should be taken that chemicals such as formalin are not used to treat milk, which would create a hazardous substance, reducing the options for disposal. Treated milk could be incinerated, fed to animals, processed or sprayed on pasture.

Large volumes of contaminated milk at dairy factories or in tankers should always be inactivated. In the Netherlands during the outbreak of foot-and-mouth disease in 2001, milk from infected farms was acidified with citric acid to pH < 5, rendered and then incinerated. Milk from vaccinated farms was subjected to high-temperature, short-duration pasteurisation treatment, and then heated again until a negative reaction to the peroxidase test was obtained. It was then converted to powdered milk at a designated factory (De Klerk 2002).

4.2 Hatching eggs and hatchery waste

Before disposal of hatching eggs and hatchery waste into burial pits, all material should be macerated to ensure the extinction of life. Assistance should be sought from the poultry industry for the supply of suitable equipment and for guidance on its use.

4.3 Effluent

[xxSection still under development]

4.3.1 Dairy processing facilities

Effluent (such as washing water from dairy factories) presents special problems because of its volume. Chemical treatment of large volumes of effluent may render it unacceptable to a sewage disposal unit, but 0.2% citric acid should cause no problems. The danger from effluent is greatly reduced by dilution, and the free use of more water than normal in the usual cleaning processes will further reduce the danger.

Where effluent is normally irrigated over pastures, these should not be grazed for at least two weeks after irrigation (or for the period given in the relevant **Disease Strategy**). Rennet, casein, whey or other wastes must not be sprayed over pastures, discharged into drains or fed to animals, unless treated with disinfectant as for milk.

4.3.2 Dairy farms

Effluent systems for modern milking sheds often reuse the water for cleaning yards. The large volumes of waste from wash-down and sanitisation of equipment require special attention.

4.3.3 Piggeries

[xxSee above – section under development]

4.4 Effluent and litter

Small amounts of solid manure may be disposed of by burial or cremation (see the **Decontamination Manual**).

Spray the surface of poultry litter with a disinfectant (see the **Decontamination Manual)** and either compost or bury (see Appendix 1). Monitor the conditions in the compost windrows to ensure they will kill the infectious agent. Composting is an effective way to deal with manure and litter waste (see Appendix 7 [xxunder development]). Material can be composted inside sheds or otherwise on site, eliminating the risk of spreading the virus during transport. If litter is to be removed, it will be necessary to moisten the surface with a disinfectant and possibly heap the litter in mounds under plastic before removal.

4.5 Wool and mohair

Bales may need special consideration.

4.6 Semen and ova

Where genetic material is stored on infected premises or dangerous contact premises, its existence should be brought to the attention of the controller of the local disease control centre (LDCC), who will determine if it constitutes a risk and must be destroyed. Because of the potential value of such material, no action should be taken to dispose of it without the express authorisation of the LDCC controller (see the **Artificial Breeding Centres Manual**).

4.7 Laboratory wastes

For the disposal of laboratory wastes, see the **Laboratory Preparedness Manual**.

5 The decision-making framework

5.1 Introduction

A 'decision-making process', or other documented method for reaching a decision, is recommended to allow existing conditions to be considered against a variety of different methods. This technique uses the weighting of the various components and an assessment of their utility to reach a conclusion on the best options available. If a disposal method is not available for operational or disease management reasons, it is excluded from the process at the outset.

The two-dimensional matrix aims to give structure to the consideration of complex interactions in a way that demonstrates the transparency of the expert team's decision (see Section 2.2). The team works on the matrix together, and the result should be a ranked list of acceptable disposal methods agreed by the majority of the team. This process should be guided by a skilled facilitator, who may be the local disease control centre (LDCC) disposal coordinator. The ranked list needs to be determined within a short timeframe.

It will probably be necessary to perform this process for different types of wastes, which have different handling and disease-risk characteristics. A 'one size fits all' solution is unlikely.

5.2 Factors to consider

In order to assess and prioritise a number of disposal methods according to their appropriateness, a decision-making framework should include all relevant factors and be flexible enough to allow modifications for different situations and locations. A number of alternatives may be appropriate or necessary to begin the process; in time, a single method may dominate the long-term, large-volume disposal operation. The decision-making framework should include, but is not limited to, the following factors.

5.2.1 Is the disposal method safe for the operator?

Under legislation in all states and territories, all transport and disposal activities to be carried out in the event of an emergency animal disease (EAD) outbreak must be subject to risk assessments before they are undertaken. The purpose of this is to ensure the safety of the workers involved. Some disposal methods are inherently more risky than others, such as digging a burial pit compared to consigning waste to a registered landfill site via a contractor. Other methods may be equally risky, but the risks may be different. Worker safety must rank highly when a disposal method is being chosen, and every effort must be made to remove identified risks. In most cases, personal protective equipment will be required.

5.2.2 Might the method raise community concern?

Potential community concern will have to be assessed site by site. Ensuring that the environmental impact of a disposal method is minimised will help to reduce community concerns. Proximity of the operation to human habitation and failure

to keep the community fully informed will increase concerns. The location of the operation will often cause more concern than other factors. Ongoing liaison with the community is imperative.

5.2.3 Is the method consistent with international agreements and standards?

The international community will decide how soon to resume trade with Australia after an EAD outbreak. To a large extent, its confidence will be determined by our correct use of internationally accepted methods of control and eradication.

5.2.4 Are acceptable transport methods available?

A number of the disposal methods that may be useful rely on the transport of infected or potentially infected materials either within the infected premises or to another location. The infectiveness of the disease agent and the need to maintain a specific level of biosecurity will determine the type of transportation required. Assessing the availability of vehicles of the required type will help to determine if a disposal method is viable.

5.2.5 Does the method meet legislative requirements, and can the necessary regulatory approvals be obtained?

Environmental legislation, in particular, needs to be considered. However, other legislation could also affect the choice of method, such as legislation that deals with the handling of dangerous goods.

5.2.6 Is the method consistent with industry standards and agreements?

Standards vary from industry to industry and sometimes from state to state, and may vary according to the location of the outbreak. They should be considered on a local basis.

5.2.7 Is the method cost effective?

It is difficult to fully cost the available disposal methods. Initial setup costs can be determined, but ongoing maintenance, management and monitoring costs need to be assessed.

5.2.8 How quickly will the method resolve the disposal problem?

Usually, a disposal method that neutralises the infected material as soon as possible is preferable. Consideration needs to be given to continuing costs of methods that may provide quick solutions but require long-term maintenance, management and monitoring, or extensive remediation work. For example, burial may be quick, but the need for monitoring and potential problems with aquifer contamination may make it less acceptable than composting, which may need longer management but produce a desirable, readily disposable product.

The availability of resources, such as fuel, expertise and equipment, must also be considered.

5.3 Five steps to follow: the decision matrix

Step 1

Determine which disposal methods can be effectively used to control and destroy the infective agent.

Step 2

Appendix 1 lists wastes generated during EAD outbreaks. Determine the type and quantity of waste likely to be generated and the waste-stream classification that each category of waste is likely to be in. If necessary, treat the waste to reduce its waste category to the lowest level (ie the easiest for disposal). Much of the waste generated will be in small quantities and, unless it is 'hazardous', it should be able to be processed using existing waste treatment facilities. For example, clinical wastes and sharps could be disposed of via licensed clinical waste contractors.

Step 3

Assess the relative importance of the following factors for the disposal methods identified in Steps 1 and 2 (additional factors may need to be included, as appropriate):

- operator safety;
- community concerns;
- international acceptance;
- transport availability;
- legislative requirements;
- industry standards;
- cost effectiveness; and
- speed of resolution.

Use a decision-making matrix to compare each method with the others, taking all of the factors into account. The matrix can be set up in a computer spreadsheet, with the disposal methods listed in columns and the factors in rows (see Table 1). Using a computer spreadsheet will allow quick recalculation of weightings and values and the testing of various combinations. Different matrixes may be required for different materials (eg carcases, litter, products), depending on the situation.

Table 1 Blank decision matrix

Method		Pyre		Burial		Composting		Rendering	
	Weight	Utility	Value	Utility	Value	Utility	Value	Utility	Value
Factors									
Operator safety									
Community concerns									
International acceptance									
Transport availability									
Legislative requirements									
Industry standards									
Cost effectiveness									
Speed of resolution									
Total	100		Sum		Sum		Sum		Sum

Each factor is weighted by its relative importance (F). For example, operator safety and community concern will be weighted highly compared to other factors. The total of all weightings must come to 100 (Table 2). For each method being assessed, allocate two columns. The first column is a utility value (U). This value is a number between 1 and 10 allocated according to how well a method achieves or attains the desired ideal (1 = the worst possible fit and 10 = the best fit). The second column is the value (V) of the factor's weighting (F) multiplied by the utility ($V = F \times U$).[5]

Table 2 Example matrix with weightings

Method		Pyre		Burial		Composting		Rendering	
	Weight	Utility	Value	Utility	Value	Utility	Value	Utility	Value
Factors									
Operator safety	20								
Community concerns	15								
International acceptance	15								
Transport availability	15								
Legislative requirements	10								
Industry standards	10								
Cost effectiveness	10								
Speed of resolution	5								
Total	100		Sum		Sum		Sum		Sum

The weighting given to the factors and the utility values are estimates made at the location by people who know and understand local conditions. There are no hard and fast rules for the estimates, other than that they should be in proportion to each other based on knowledge of local conditions. Because any one person will be unlikely to have a full understanding of all the information required, it is suggested that a group consisting of at least a veterinarian, an environmental

[5] The figures used in the example in these tables are not meant to reflect a particular EAD or situation.

protection officer and a transport and equipment coordinator be consulted before this decision framework is used.

After a weighting is given to each factor and a utility value is allocated to each method, values produced for each factor can be summed to give a total for each method (Table 3). Once this is calculated for all methods, they can be compared with each other and ranked according to their sums. In this example, rendering is best, followed by burial and composting.

Table 3 Example of completed matrix

Method		Pyre		Burial		Composting		Rendering	
	Weight	Utility	Value	Utility	Value	Utility	Value	Utility	Value
Factors									
Operator safety	20	5	100	5	100	8	160	10	200
Community concerns	15	2	30	6	90	8	120	10	150
International acceptance	15	8	120	8	120	5	75	10	150
Transport availability	15	10	150	10	150	10	150	4	60
Legislative requirements	10	10	100	8	80	8	80	10	100
Industry standards	10	6	60	8	80	5	50	10	100
Cost effectiveness	10	5	50	5	50	5	50	6	60
Speed of resolution	5	8	40	8	40	5	25	10	50
Total	100		650		710		710		870

Step 4

Assess the resources available to carry out the methods identified in Step 3. If resources are not available, delete the method. If resources are limited, plan to use the method with the highest score first, before moving to the method with the next highest score. For example, rendering usually outscores most other methods, but has either a limited capacity or none at all. If it is available, use it first.[6]

Step 5

Assess the environmental impacts of the remaining methods and choose the method with the least impact on the environment.

5.4 Ensuring accountability

As with all decisions made in an EAD response, the process by which the recommendation on disposal is decided must be transparent and accountable. To achieve this, it is best that a standard format be followed for submitting the recommendation to the local disease control centre or the state disease control headquarters.

[6] See Australian Standard AS 5008:2001 — Hygienic rendering of animal products. http://www.standards.com.au/Catalogue/script/Details.asp?DocN=AS760700670543

The recommendation must include a list of the members of the team who completed the matrix, a ranked list of recommended disposal options, a copy of the completed decision matrix, a list of reference material referred to, and a brief summary of the advantages and disadvantages of each option. The report format can be found in Appendix 6.

6 Media and community concerns

[xxThis section is under development]

This section should be read in conjunction with the AUSVETPLAN **Public Relations** manual. It draws attention to areas that will need to be addressed by managers and media staff as a result of disposal activities.

It is important to clearly state to the public and media that the disposal options being used were adopted on the recommendations of an expert panel (see Section 2.2). Secondly, it should be emphasised that the disposal arrangements do not impede the disease control measures, particularly slaughter of infected animals, as delays will result in the potential spread of the disease. This will necessitate the slaughter of more animals and/or reduce the disposal options available because the disposal of decomposing carcases is difficult.

The following aspects are likely to give rise to community concerns and need to be addressed in any communications plan.

6.1 Decision-making process

It is important that communities are consulted at all stages and that the technical aspects upon which decisions are made are clearly stated.

The establishment of the expert team and the expertise included should be widely known (see Section 2.2).

6.2 Biosecurity issues

The transport of carcases and contaminated materials will be a cause of concern because of the potential for spread of infection. The safeguards taken need to be clearly stated.

One specific area is the potential for organisms to spread by thermal air currents when materials are burnt. Studies carried out in the United Kingdom in 2001 showed this to be unlikely (Bourne 2001, Gloster et al 2001).

6.3 Potential pollution

Issues that may be of concern to the public include:

- the generation of odours from carcases (eg during composting);
- the potential for leachate to pollute water supplies;
- the potential for air pollution to result from burning of carcases and other material, and the resulting impacts on health (especially for asthma suffers); and

- the extent and length of proposed monitoring programs.

6.4 Community impacts

Issues that may be of concern to the public include:

- use of local resources to the detriment of the local community, such as use of local fuels, filling of local landfills, and the deterioration of facilities, such as roads, due to use of heavy machinery;
- potential restriction of access to facilities, such as landfill sites; and
- future plans for the rehabilitation of disposal sites, the time required for rehabilitation and any potential restrictions on the use of the sites.

Appendix 1 Types of potentially contaminated materials

Materials that may need to be transported and/or disposed of during an emergency animal disease (EAD) response

Material	Description	Comments/issues
Acidic and basic (alkaline) solutions	Prepared solutions for treating infected material	• May require neutralising before disposal
Acids and bases in solid form	Solid form of acids and bases before preparation	• Refer to material safety data sheet (MSDS) for information on occupational health and safety (OHS), storage, handling and disposal options
Air filters and residues from air filters	Derived from clean-up units involved in sewage treatment and transportation of animal carcases and other wastes	• Consign to licensed hazardous waste disposal agent, or treat. The treatment will depend on the infective agent.
Animal carcases (infected)	Assumes animals slaughtered recently to prevent loss of significant quantities of fluid. May need to consider carcases removed to knackeries.	• Can be very difficult to handle • Decomposition occurs quickly within hours of slaughter, faster in summer than in winter • Ruminants (cattle, sheep, goats etc) begin to expand rapidly after death because of the gases trapped in the rumen. Nonruminants (eg horses) pose a similar but lesser problem. • Odours can cause significant public concern and may also affect the willingness of workers to deal with carcases • Leakage of materials has to be avoided
Animal fluids, including rumen fluid, blood etc	Largely viscous fluid	• Similar problems to animal carcases
Animal viscera, meat and bone (infected)	Mixture of fluid and semiprocessed animal parts	• Similar problems to animal carcases
Ash/remnants after burning	Remains of the funeral pyre, which may contain some incompletely burnt animal material, bones etc	• Bury
Bedding and litter (infected)	Used or unused (if infected)	• Quantity of material may be substantial • Material may be in a solid, semisolid or liquid form • Leakage must be avoided • May be suitable for composting

Material	Description	Comments/issues
Blood and bone products	Processed material that has already either been put on market shelves or is destined for the market	• Used material may require treatment to ensure that infectivity is eliminated • Procedures for recall, treatment and disposal need to be put in place
Chemical containers	Disinfectants etc come in a variety of container shapes and sizes. There will be large numbers of these containers.	• Check MSDS for instructions on handling and storage • Triple washing of containers is considered adequate to remove most chemicals and reduce the hazard, but this depends on the chemical. Container label should identify contents. • Washings from containers need to be disposed of in an environmentally sound manner
Clinical and related wastes (including sharps)	A complex mix of material containing potentially infectious materials, sharps etc	• Dispose of in usual way, ensuring use of biohazard disposal containers
Clothing and footwear — disposable (infected)	Single-use or single-premises; used in slaughter, transportation, disinfection and disposal stages of EAD response	• System for appropriate treatment and packing needed before disposal
Compost	Some intensive enterprises (eg poultry units, feedlots) compost bedding, litter and carcases. May be in large volumes.	• Management of process and site • Monitoring of compost windrow conditions and infectivity • Potential markets and users need to be identified
Detergents and surface-active agents (diluted and undiluted)	Used in normal clean-down operations (refer to MSDS for active ingredients)	• Refer to MSDS and use appropriate method of disposal
Disinfectant mats	Carpet and other types of matting used on roadways and at entrances for disinfecting car tyres	• Usually limited numbers • Disposal at local landfill site probably possible, but need to check state/territory regulations
Disinfectant wash-down waters Portable shower waste	Water that may contain acids, bases, oxidising agents, detergents and surface active agents along with soil etc in relatively low concentrations	• Containment, treatment and disposal of wastes must be included in any EAD program
Effluent — animal	From saleyards, abattoirs, intensive agriculture operations etc	• Biologically highly active • May be in significantly large volumes • May be able to be disposed of to liquid waste facilities or sewerage systems, but further research on this is needed • May require treatment with disinfectants or other chemicals that modify the pH, resulting in the deactivation of the microflora that normally aid decomposition

Material	Description	Comments/issues
Eggs, egg pulp	May be located on farm, in transit, packaging plants, bakeries, supermarkets	• Procedures for recall, treatment and disposal may need to be put in place • May require refrigeration until disposed of • Leakage must be avoided
Equipment	Equipment considered not worth keeping once infected (eg personal protective equipment, including respirators, boots etc)	• May be possible to consign to licensed hazardous waste disposal operation
Farm animal disposal sites	Many farms have a pit of some type where animals that die of noninfective or non-notifiable diseases are buried	• See *Animal carcases (infected)* • Proximity to groundwater and surface water • Feral animal transmission of disease
Feed (stock/animal) — infected? (hay, lucerne, grain etc)	Suspected or confirmed infected	• Treatment will vary with material and infective agent
Filter cake	From sewage treatment	• See *Effluent — animal*
Fire debris and fire wash waters	Water used to wash fire area, or rainfall on fire area	• Ensure that water does not run into groundwater drains
First aid wastes	Bandages, bandaids, slings etc used to treat staff	• Consign to licensed hazardous waste disposal operation
Food — unprocessed or partially or fully processed (infected?)	May be located on farm, in transit, or at abattoirs, milk processing factories, pet food manufacturers, supermarkets	• May require refrigeration until disposed of • Leakage has to be avoided
Food and drink packaging	Used on infected premises	
Food packaging	Recalled produce (eg milk cartons, meat wrappings, egg cartons)	
Grease trap waste	As part of sewage or waste-stream processing	
Hatchery waste — eggs	May require maceration before disposal	• May require pre-treatment before disposal, depending on agent
Hides and partially/fully processed leather	Locate on farm, in abattoirs, and further down the process line	• Infectivity highly dependent on the disease involved
Laboratory animal specimen waste	Specimens taken from infected and suspect animals for analysis	• Volumes will probably increase relative to normal operations • Continue to use normal disposal routes

Material	Description	Comments/issues
Liners for trucks used to transport infected animal carcases	Liners will most likely require frequent replacement, so quantities of used and infected liners will become a disposal problem	• May require pretreatment before disposal, depending on disease involved
Live animals		• Must be handled in accordance with animal welfare legislation and codes of practice
Manure	On farms, on land, in sheds, in saleyards, abattoirs etc	• Similar issues to filter cake • May be able to be composted or beneficially used depending on disease agent
Meat — unprocessed or partially or fully processed (infected?)	May be located on farm, in transit, or at abattoirs, knackeries, pet food manufacturers, supermarkets	• Procedures for recall, treatment and disposal may need to be put in place • May require refrigeration until disposed of • Leakage must be avoided
Milk and dairy products — unprocessed or partially or fully processed (infected?)	May be located on farm, in transit, or at milk-processing factories, supermarkets	• Procedures for recall, treatment and disposal may need to be put in place • May require refrigeration until disposed of • Leakage and aerosols must be avoided
Miscellaneous items from disposal operations not listed elsewhere	All other waste not listed separately. May include equipment/housing materials that cannot be effectively decontaminated.	
Office wastes	Some office wastes may be confidential and will need to be secured at all times	• Use usual recycling, reuse and disposal methods unless infective
Oil/hydrocarbon and water mixtures or emulsions	May be in chemicals used to treat infected animals and materials etc	• Need to be treated and/or disposed of in an appropriate and environmentally safe manner
Oxidising agents (diluted)	Products such as Virkon®, prepared for treating infected/contaminated material	• If used in decontaminating equipment, ensure all equipment adequately rinsed and washings collected and appropriately treated before disposal
Pesticides – unused remnants	Incidental use of chemicals required by veterinarian	• Follow procedures in MSDS or on container label • Follow relevant guidelines for disposal • Use only in accordance with label
Pharmaceuticals, drugs and medicines (surplus to use, out of ‘use by’ date, residual etc)	Includes drugs used to euthanase infected, suspect or dangerous contact animals	• Follow appropriate normal procedures for treatment and disposal
Postdecomposition products	Safe byproduct of a chemical, anaerobic or aerobic disposal process	• May be a commercial product or require burying

Material	Description	Comments/issues
Seeds and grain	Principally found on farm, possibly infected	• Disinfect if in sealed containers
Semen and ova (infected)	Will have to follow document trail from infected premises	• May need disinfection before disposal
Sewage sludge or residues	Mainly saleyards, abattoirs and intensive operations (eg dairies, feedlots)	• See *Filter cake*
Soil contaminated with disinfectants, detergents etc	Soil contaminated with chemical spillage from treatment or disinfectant areas	• Check MSDS for information on constituents and safety information
Soil contaminated as a result of the slaughter process	Contaminated byproduct of the slaughter process	• May require burying or burning, depending on the organism involved
Tallow	Found principally in abattoirs and tanneries	
Tannery wastes, including leather dust, ash sludges and flours	Specialised industry	• Wastes may require neutralising
Truck wash-down containing faeces, body fluids etc	Will be an infectious material	• Same as for *Animal carcases (infected)*
Waste derived from processing infected food	Byproducts derived from the processing of animal carcases etc	• May follow similar disposal path to food and/or effluent or filter cake
Wool scouring wastes	At fellmongers, abattoirs etc	• Most organisms unlikely to survive this treatment. Any treatment will depend on the infective agent involved • Determine whether treatment of products and perception of continued infectivity allows for economic use of products after treatment
Wool, cashmere, mohair, feathers, deer velvet	On farm, at fellmongers, abattoirs, wool processing industries, stockpiles etc	• Determine whether treatment of products and perception of continued infectivity allows for economic use of products after treatment

Note: Each product will need to be classified according to local legislation relevant to waste disposal

Appendix 2 Predisposal processing options

Treatment	Principle	Advantages	Disadvantages
Chemical sterilisation/ decontamination	Many AUSVETPLAN decontamination procedures are built around the use of chemicals for sterilisation or decontamination. The chemicals used vary for each disease and range from agents that simply change pH, such as citric acid and NaOH, to more powerful oxidising agents such as Virkon®.	• Procedures for chemical disinfection are well documented and understood	• occupational health and safety (OHS) concerns • Environmental concerns
Heat sterilisation / decontamination	Heat sterilisation is a well-recognised method of destroying pathogens. It can include direct sunlight, gas and electrical heating elements.	• Uses existing technology • Available throughout the country • Can be used immediately	• Expensive • Only available for some materials • Capacity is limited
Maceration	Maceration of carcases and other materials will generally reduce their volume, and possibly make them easier to handle and speed the rate of decomposition/disposal.	• Ease of handling • Different types of vehicles can be used to transport the material (eg tankers, concrete trucks) • Allows improved mixing of disinfectant products (adjuvants) with material • Increased speed of decomposition/disposal	• Increased production of aerosols • Need for additional equipment • OHS concerns • Difficulty decontaminating equipment
Combined steam sterilisation and maceration	Sterilisation combined with maceration involves steam-sterilising the waste and then grinding it for delivery to landfill or composting.	• Will remove most infective agents by steam sterilisation • Waste produced can be buried in landfill site that accepts uninfected putrescible waste • There is a portable unit that can be taken on-farm • Suitable for treating small ruminant and poultry carcases	• Capacity too small for large numbers of large ruminants and horses • Impact on Australia's international markets

Treatment	Principle	Advantages	Disadvantages
Chilling	Chilling has been used in Europe as an emergency measure to hold carcases for later disposal. Opportunities could arise if chilling facilities at an abattoir become available because the abattoir is itself caught up in the emergency animal disease (EAD) outbreak. Chilling also needs to be considered as an option for animal products to be disposed of later.	• Quick response to a medium-scale incident • Freezers are generally easy to build. Some mobile freezers may be available from the game meat industry. • Offers time to consider future action • Could handle carcases and byproducts	• Expensive • Impact on future trading • Problems handling whole carcases • Rehabilitation of chiller equipment • Freezer trucks will not freeze material not already frozen (designed to hold items that have already been frozen to –20°C) • May not be enough refrigerated containers available in a large outbreak
Time treatment	Many pathogens responsible for causing EAD emergencies only survive for limited periods in the environment, particularly if conditions are hot and dry. If it is known that a pathogen will deteriorate and disappear over time, it may be more appropriate to do nothing other than restrict access to the area and wait. This is an option for remote animal communities and feral animal populations, which can be isolated by distance.	• No chemicals used • Labour requirements minimal • Costs are reduced • Waste classification changes from hazardous to a lesser category • No transport requirements	• Public perception may be negative • Some organisms may not disappear as fast as predicted • Inability to use the property during the waiting period • Potential impact on trade • Inability to restrict access by feral animals

Appendix 3 Environmental checklist

This check list should be used as a prompt.

Detailed consideration of many items will not be required if adequate preparation has taken place.

Use of appropriate experts on the expert team, including those with local knowledge, will speed consideration of most items.

The items grouped under 'Assessment' require early consideration, whereas those grouped under 'Operational' can be considered later.

Wastes

Assessment

- Is there a beneficial reuse available for this material, rather than pursuing disposal/destruction/treatment?
- What waste minimisation and management plans are in place for the activity?
- What are all likely waste products? How would they be classified and disposed of?
- What are the biohazards posed by the disease organism?
- What measures can be used to inactivate the agent?

Site

Assessment

- Where is the proposed site of treatment/disposal?
- What are the general topographical, geological and hydrological characteristics of the site?
- Where are the population centres located? How far away are they, and which direction does the prevailing wind travel?
- Is it located within an environmentally sensitive or protected area?
- Are uses of this site restricted or prevented by a legal instrument, planning instrument, declaration, agreement or other device?
- Can the necessary environmental and planning approvals needed for this activity be gained?
- What are the previous land uses of the site?

- Is the site potentially contaminated? If so, with what and how would this be managed?
- Could contamination of the site result from the activity?
- If an environmental impact statement is needed for approval for this type of activity, is the required information available?
- What are the risks to the local ecosystem or other wildlife, including aquatic life?
- Is any legacy of the activity likely to have an impact on future sustainable use of the area?
- What process is planned to consult neighbours and stakeholders about the proposed activity?
- What rehabilitation plans are needed for the site after the activity ceases?
- What impact will this activity have on the future of the site?

Operational

- What odour/air pollutant mitigation procedures are needed and/or have been put in place?
- What noise and vibration mitigation measures are needed and/or have been put in place?
- What dust mitigation measures are needed and/or have been put in place?
- What could be done to prevent site contamination?
- Is vermin control needed to minimise the risk of transmitting the disease outside those areas already infected?
- What environmental protection measures will be put in place during the construction phase? This is especially important if heavy equipment is used, because of the need for sediment and erosion control.
- Have staff been adequately trained in the use of chemicals and other materials classed as dangerous goods or hazardous substances?
- What security measures are needed to ensure appropriate environmental protection and protection of human health?
- What environmental monitoring and recording systems are in place?
- Would the cumulative impacts of the activity be detrimental to the environment in the short or long term?

Weather

Assessment

- Are the current weather and weather forecast for the area of disposal favourable?

Water

Assessment

- Is there surface water (rivers, creeks, lakes, dams etc) in the area? Include consideration of distance from site, containment methods etc.
- Could surface water be polluted or otherwise affected?
- Is the surface water used as a source for town water supplies?
- Where does the surface water drain to, and how are the receiving waterways and downstream waterways going to be affected by the proposed activity or ongoing activities?
- Does the disease agent survive in water and, if so, for what period?
- Are groundwater aquifers in the area known?
- How deep is the groundwater in the area?
- Is the watertable at a normal level or has there been a drought/flood or other event that has altered the level?
- Are the groundwaters under the site currently used beneficially? Is there a plan for such use?
- Are the groundwaters part of the local town water supply?
- Are the soils surrounding the operation sufficiently permeable to allow contamination of groundwater during heavy rainfall?
- What could be done to prevent pollution of groundwater?

Transport

Assessment

- Are appropriately licensed waste transporters and other contractors needed? If so, are they available?

Operational

- Have drivers been trained and licensed, and vehicles licensed, to transport dangerous goods?
- What biosecurity measures need to be in place?

Monitoring

Operational

- What monitoring program is appropriate for the site management system and surrounding environment, given the activity?
- To whom should the monitoring data be provided?
- Who will review the monitoring data and any trends that emerge?
- How long should monitoring continue?
- What procedures should be followed if the monitoring indicates a problem, and who will take this action?
- Who is responsible for any long-term monitoring?

Burning of carcases

Assessment

- What are the direction and speed of the prevailing winds and other likely winds? What options are available if wind direction changes?
- Are the current weather and weather forecast in the area of disposal favourable for pit/pyre construction and/or burning purposes?
- What fuels are available, and of what quality and quantity? Efforts need to be made to minimise emissions and air pollution.
- What care has been taken in construction to ensure that run-off from the site does not cause pollution of waters or site contamination?
- Is the site close to an environmentally sensitive area, such as a wilderness area, a declared area or a bird nesting area?
- Is the site under any international or domestic flight paths? Is the smoke generated by the fire likely to be an aviation hazard?
- Are the pyres as constructed going to ensure 100% kill of the disease agent?

Operational

- Is there a fire ban or no burn day current?
- What arrangements have been made for disposal of ash? Is there a risk of leaching?
- Have the personnel constructing the pyre, pit etc been trained in their construction to maximise the efficiency of the burn?
- What prevention measures have been put in place to ensure that run-off to environmentally sensitive areas (including groundwater) will not occur?

- What measures have been taken to ensure that smoke from the fire is minimised and burning is efficient?
- What air-quality monitoring is proposed?
- In the case of pits, what site remediation is planned?

Burial

Assessment

- Where pits, landfills etc are to be constructed, is the soil at depth permeable, semipermeable or nonpermeable?
- If the soil at depth is nonpermeable, is the integrity of the soil such that it will retain leachate over time?
- Do the bottom or sides of the pit show signs of fissures that might result in loss of containment?
- Should liners be used, or will the native soils provide sufficient protection to groundwater?
- Should leachate be collected or processed? How should leachate be treated?
- If gas generation from putrescible waste is a problem, how will gases generated from the site be released or processed?
- Has preliminary representative sampling been done before construction, to allow comparisons?
- Are the soils acid, alkaline or neutral?

Operational

- Is the supply of suitable liner and capping material guaranteed? Is it local, or will there be significant delay in delivery?
- What capping material should be used?
- What monitoring regime should be implemented for the burial site, leachate system, gas system and groundwater?
- If the soil by its nature preserves rather than aids decomposition, should chemical additives be applied to the pit to aid decomposition? If so, which chemicals? What impact will these have on the soil and groundwater?
- What subsidence of the pit is likely with the total decomposition of the buried carcases?
- What is the proposed use for the land after the site has been vacated?
- What medium-term public risk protection is required?

Landfill

Assessment

- Are there any landfills in the control area (CA) suitable for disposal of carcases?
- Are there suitable landfill sites just outside the CA, to which a biosecure corridor may give access?
- Is the landfill well managed?
- Is the landfill licensed?
- Will extra procedures and measures be required to ensure biosecurity?
- Is the use of the landfill likely to cause short-, medium- or long-term problems for the local community because of diminished capacity as a result of its use in the emergency animal disease (EAD) response?

Operational

- What monitoring procedures are required?
- What biosecurity measures are required?

Composting

Assessment

- Is there sufficient suitable land available within the CA?
- Is the site licensed to accept waste? Can an existing commercial operation be used?
- What management practices are to be put in place to protect the environment?
- Is the site in an area where concerns may arise about odour?
- What is the source of the carbon required for composting?
- What are the options for using the final compost product (eg farms with or without livestock, forest land, gardens, disposal to landfill or other burial)?

Operational

- Is there ongoing expertise to manage the process?
- How is best practice management of the site to be established?
- What predator/feral animal protection measures are to be put in place?
- What monitoring procedures are required?

Appendix 4 Postdisposal checklist

General

- Is the site to be returned to its original use? Does it require further remediation? If so, has that action been promulgated?
- Has an operational staff debriefing been conducted?
- Have the site's position and use been appropriately documented?
- What, if any, long-term monitoring and/or byproduct treatments are required? Have they been implemented?
- What, if any, ongoing pest control is required? Has it been implemented?
- Has the site been decontaminated?

Pit burial

- Have appropriate public risk safeguards been completed?
- Have the long-term issues of rehabilitation been resolved?

Pyre

- Have the remains of the pyre been appropriately disposed of?
- Has excess fuel been returned or disposed of?

Pit burner

- Has all machinery been decontaminated and returned?

Compost site

- Is there ongoing expertise to successfully complete the process?
- What is the fate of the end product? Is its disposal finalised?

Appendix 5 Transport checklist

General

- What needs to be transported (liquids, solids, animals live or dead, machinery, fuel etc)?
- How much is to be transported?
- How far does it have to be transported?
- What timeframe is there for transporting?
- Are the animals alive or dead? If alive, what are the animal welfare issues?
- What biosecurity procedures need to be implemented?
- How are the vehicles going to be loaded/unloaded?
- Are there enough readily available transport resources to meet the task?
- If transport resources are not readily available, how long until they will be?
- Is the disease transmissible to humans?
- What decontamination processes for drivers and vehicles need to be followed? These will affect turnaround time and environmental protection.
- What training is required? (see below)
- Are there adequate access and exit points for transport resources at pick-up, at destination, and along the route to be followed?
- Is the ground suitable for heavy vehicles at all points, taking into account the stability of the ground and axle loadings on uneven ground?
- Is there a ready supply of tarps etc for trucks? If not, what is the lead time for supply?
- For chilling, are the carcases already frozen? Refrigerated vehicles will keep frozen goods to –20°C, but will not freeze them.
- Is the option chosen realistic, given the available resources?
- Is there an approved road accident strategy?
- Has the emergency management transport coordinator been consulted in the decision-making process?
- Have all vehicle defects, etc been recorded? (This should be done before starting work.)
- Are legal requirements satisfied (eg classes of material to be transported, specification of routes, requirements for placards, times of travel, driver qualifications)?
- Has the appropriate authority been involved?
- Has the public been advised of routes and safeguards in place?
- What are the likely costs and have they been approved?

Driver training

- What precautions does the driver need to take?
- Is there any long-term impact on the vehicle?
- What training is required for the drivers and owners of vehicles?
- Is a training information/package available?
- What timeframe is required to deliver the training?
- Does the training/education material address all the concerns of the driver/owner?
- Are emergency decontamination kits available, and are drivers trained in their use?

Appendix 6 Form of recommendation to LDCC/SDCHQ on disposal options

CASE NO: _____

LDCC _____ (Location)

PROPERTY IDENTIFIER/DISTRICT _____

I **RECOMMEND** THAT THE FOLLOWING DISPOSAL OPTIONS BE IMPLEMENTED AT: (description of properties or relevant area)

_____

_____

Prioritised list of recommended disposal options:

1.

2.

3.

4.

Rationale for this recommendation in summary (further information attached):

_____

_____

LDCC Disposal Coordinator

Name:.....Signature: .....Date:.....

Attachments

- Membership of expert team
- Decision-making process
- Summary of advantages and disadvantages for each recommendation
- Summary of reasons for rejection of unacceptable options
- List of reference material used

Approved

LDCC Operations Director

Name:.....Signature: .....Date:.....

SDCHQ Director

Name:.....Signature: .....Date:.....

Signed copy for information to LDCC controller at _____

Appendix 7 Standard operating procedure for composting litter on farms

[xxTHIS SECTION IS UNDER DEVELOPMENT]

Glossary

Aerosol	Particles suspended in the air.
Air curtain incineration	Air is forced through a manifold, creating a turbulent environment in which incineration is accelerated.
Animal byproducts	Products of animal origin that are not for consumption but are destined for industrial use (eg hides and skins, fur, wool, hair, feathers, hooves, bones, fertiliser).
Animal Health Committee	A committee comprising the CVOs of Australia and New Zealand, Australian state and territory CVOs, Animal Health Australia, and a CSIRO representative. The committee provides advice to PIMC on animal health matters, focusing on technical issues and regulatory policy (formerly called the Veterinary Committee). *See also* Primary Industries Ministerial Council (PIMC)
Animal products	Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture, Fisheries and Forestry who manages international animal health commitments and the Australian Government's response to an animal disease outbreak. *See also* Chief veterinary officer
AUSVETPLAN	*Aus*tralian *Vet*erinary Emergency *Plan*. A series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.
Chief veterinary officer (CVO)	The senior veterinarian of the animal health authority in each jurisdiction (national, state or territory) who has responsibility for animal disease control in that jurisdiction. *See also* Australian Chief Veterinary Officer
Compensation	The sum of money paid by government to an owner for stock that are destroyed and property that is compulsorily destroyed because of an emergency animal disease. *See also* Cost-sharing arrangements, Emergency Animal Disease Response Agreement

Consultative Committee on Emergency Animal Diseases (CCEAD)	A committee of state and territory CVOs, representatives of CSIRO Livestock Industries and the relevant industries, and chaired by the Australian CVO. CCEAD convenes and consults when there is an animal disease emergency due to the introduction of an emergency animal disease of livestock, or other serious epizootic of Australian origin.
Control area	A declared area in which the conditions applying are of lesser intensity than those in a restricted area (the limits of a control area and the conditions applying to it can be varied during an outbreak according to need).
Cost-sharing arrangements	Arrangements agreed between governments (national and states/territories) and livestock industries for sharing the costs of emergency animal disease responses. *See also* Compensation, Emergency Animal Disease Response Agreement.
Dangerous contact animal	A susceptible animal that has been designated as being exposed to other infected animals or potentially infectious products following tracing and epidemiological investigation.
Dangerous contact premises	Premises that contain dangerous contact animals or other serious contacts.
Declared area	A defined tract of land that is subjected to disease control restrictions under emergency animal disease legislation. Types of declared areas include *restricted area, control area, infected premises, dangerous contact premises* and *suspect premises*.
Decontamination	Includes all stages of cleaning and disinfection.
Depopulation	The removal of a host population from a particular area to control or prevent the spread of disease.
Destroy (animals)	To slaughter animals humanely.
Disease agent	A general term for a transmissible organism or other factor that causes an infectious disease.
Disease Watch Hotline	24-hour freecall service for reporting suspected incidences of exotic diseases — **1800 675 888**
Disinfectant	A chemical used to destroy disease agents outside a living animal.
Disinfection	The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases, including zoonoses; applies to premises, vehicles and different objects that may have been directly or indirectly contaminated.

Disposal	Sanitary removal of animal carcases, animal products, materials and wastes by burial, burning or some other process so as to prevent the spread of disease.
Emergency animal disease	A disease that is (a) exotic to Australia or (b) a variant of an endemic disease or (c) a serious infectious disease of unknown or uncertain cause or (d) a severe outbreak of a known endemic disease, and that is considered to be of national significance with serious social or trade implications. *See also* Endemic animal disease, Exotic animal disease
Emergency Animal Disease Response Agreement	Agreement between the Australian and state/territory governments and livestock industries on the management of emergency animal disease responses. Provisions include funding mechanisms, the use of appropriately trained personnel and existing standards such as AUSVETPLAN. *See also* Compensation, Cost-sharing arrangements
Endemic animal disease	A disease affecting animals (which may include humans) that is known to occur in Australia. *See also* Emergency animal disease, Exotic animal disease
Enterprise	*See* Risk enterprise
Epidemiological investigation	An investigation to identify and qualify the risk factors associated with the disease. *See also* Veterinary investigation
Exotic animal disease	A disease affecting animals (which may include humans) that does not normally occur in Australia. *See also* Emergency animal disease, Endemic animal disease
Exotic fauna/feral animals	*See* Wild animals
Fomites	Inanimate objects (eg boots, clothing, equipment, instruments, vehicles, crates, packaging) that can carry an infectious disease agent and may spread the disease through mechanical transmission.
Groundwater	Any water contained in or occurring in an aquifer
In-contact animals	Animals that have had close contact with infected animals, such as non-infected animals in the same group as infected animals.
Incubation period	The period that elapses between the introduction of the pathogen into the animal and the first clinical signs of the disease.
Index case	The first or original case of the disease to be diagnosed in a disease outbreak on the index property.

Index property	The property on which the first or original case (index case) in a disease outbreak is found to have occurred.
Infected premises	A defined area (which may be all or part of a property) in which an emergency disease exists, is believed to exist, or in which the infective agent of that emergency disease exists or is believed to exist. An infected premises is subject to quarantine served by notice and to eradication or control procedures.
Landfill site	A licensed site for the disposal of approved wastes to land.
Leachate	Liquid impurities resulting from decomposition, with the potential to percolate through soil.
Local disease control centre (LDCC)	An emergency operations centre responsible for the command and control of field operations in a defined area.
Monitoring	Routine collection of data for assessing the health status of a population. *See also* Surveillance
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
National management group (NMG)	A group established to direct and coordinate an animal disease emergency. NMGs may include the chief executive officers of the Australian Government and state or territory governments where the emergency occurs, industry representatives, the Australian CVO (and chief medical officer, if applicable) and the chairman of Animal Health Australia.
Native wildlife	*See* Wild animals
OIE Terrestrial Code	*OIE Terrestrial Animal Health Code*. Reviewed annually at the OIE meeting in May and published on the internet at: **http://www.oie.int/eng/normes/mcode/a_summry.htm**
OIE Terrestrial Manual	*OIE Manual of Standards for Diagnostic Tests and Vaccines for Terrestrial Animals*. Describes standards for laboratory diagnostic tests and the production and control of biological products (principally vaccines). The current edition is published on the internet at: **http://www.oie.int/eng/normes/mmanual/a_summry.htm**
Open burning	The burning of wastes in the open without any control over emissions.
Operational procedures	Detailed instructions for carrying out specific disease control activities, such as disposal, destruction, decontamination and valuation.
Owner	Person responsible for a premises (includes an agent of the owner, such as a manager or other controlling officer).

Premises	A tract of land including its buildings, or a separate farm or facility that is maintained by a single set of services and personnel.
Prevalence	The proportion (or percentage) of animals in a particular population affected by a particular disease (or infection or positive antibody titre) at a given point in time.
Primary Industries Ministerial Council (PIMC)	The council of Australian national, state and territory and New Zealand ministers of agriculture that sets Australian and New Zealand agricultural policy (formerly the Agriculture and Resource Management Council of Australia and New Zealand). *See also* Animal Health Committee
Putrescible waste	Waste able to be decomposed by action of microorganisms.
Quarantine	Legal restrictions imposed on a place or a tract of land by the serving of a notice limiting access or egress of specified animals, persons or things.
Rendering	Processing by heat to inactivate infective agents. Rendered material may be used in various products according to particular disease circumstances.
Restricted area	A relatively small declared area (compared to a control area) around an infected premises that is subject to intense surveillance and movement controls.
Risk enterprise	A defined livestock or related enterprise, which is potentially a major source of infection for many other premises. Includes intensive piggeries, feedlots, abattoirs, knackeries, saleyards, calf scales, milk factories, tanneries, skin sheds, game meat establishments, cold stores, AI centres, veterinary laboratories and hospitals, road and rail freight depots, showgrounds, field days, weighbridges, garbage depots.
Sensitivity	The proportion of affected individuals in the tested population that are correctly identified as positive by a diagnostic test (true positive rate). *See also* Specificity
Sentinel animal	Animal of known health status that is monitored to detect the presence of a specific disease agent.
Serotype	A subgroup of microorganisms identified by the antigens carried (as determined by a serology test).
Specificity	The proportion of non-affected individuals in the tested population that are correctly identified as negative by a diagnostic test (true negative rate). *See also* Sensitivity

Stamping out	Disease eradication strategy based on the quarantine and slaughter of all susceptible animals that are infected or exposed to the disease.
State or territory disease control headquarters (SDCHQ)	The emergency operations centre that directs the disease control operations to be undertaken in that state or territory.
Surveillance	A systematic program of investigation designed to establish the presence of, extent of, or absence of a disease, or of infection or contamination with the causative organism. It includes the examination of animals for clinical signs, antibodies or the causative organism.
Susceptible animals	Animals that can be infected with a particular disease.
Suspect animal	An animal that may have been exposed to an emergency disease such that its quarantine and intensive surveillance, but not pre-emptive slaughter, is warranted. *or* An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises	Temporary classification of premises containing suspect animals. After rapid resolution of the status of the suspect animal(s) contained on it, a suspect premises is reclassified either as an infected premises (and appropriate disease-control measures taken) or as free from disease.
Tracing	The process of locating animals, persons or other items that may be implicated in the spread of disease, so that appropriate action can be taken.
Vaccination	Inoculation of healthy individuals with weakened or attenuated strains of disease-causing agents to provide protection from disease.
Vaccine	Modified strains of disease-causing agents that, when inoculated, stimulate an immune response and provide protection from disease.
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A *biological* vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A *mechanical* vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.
Veterinary investigation	An investigation of the diagnosis, pathology and epidemiology of the disease. *See also* Epidemiological investigation

Wild animals	
– native wildlife	Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials).
– feral animals	Domestic animals that have become wild (eg cats, horses, pigs).
– exotic fauna	Nondomestic animal species that are not indigenous to Australia (eg foxes).
Zoning	The process of defining disease-free and infected areas in accord with OIE guidelines, based on geopolitical boundaries and surveillance, in order to facilitate trade.
Zoonosis	A disease of animals that can be transmitted to humans.

Abbreviations

AUSVETPLAN	Australian Veterinary Emergency Plan
CA	control area
CCEAD	Consultative Committee on Emergency Animal Diseases
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	chief veterinary officer
DAFF	Department of Agriculture, Fisheries and Forestry (Australian Government)
EAD	emergency animal disease
LDCC	local disease control centre
MSDS	material safety data sheet
NMG	national management group
OHS	occupational health and safety
OIE	World Organisation for Animal Health (Office International des Epizooties)
SDCHQ	state or territory disease control headquarters

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Index