AUSTRALIAN VETERINARY EMERGENCY PLAN

AUSVETPLAN

Response strategy African swine fever

Version 5.0

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.

National Biosecurity Committee

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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.

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1 Introduction

1.1 This manual

1.1.1 Purpose

As part of AUSVETPLAN (the Australian Veterinary Emergency Plan), this response strategy contains the nationally agreed approach to the response to an incident – or suspected incident – of African swine fever (ASF) in Australia. It has been developed to ensure that a fast, efficient and effective response can be implemented consistently across Australia with minimal delay.

1.1.2 Scope

This response strategy covers ASF caused by ASF virus.

The response strategy provides information about:

- the disease (Section 2)
- the implications for Australia (potential pathways of introduction, expected impacts and critical factors for a response) (Section 3)
- the agreed default policy and guidelines for agencies and organisations involved in a response to an outbreak (Section 4)
- declared areas and premises (Section 5)
- quarantine and movement controls (Section 6)
- establishing proof of freedom (Section 7).

The key features of ASF are described in the African swine fever fact sheet (Appendix 1).

1.1.3 Development

The strategies in this document for the diagnosis and management of an outbreak of ASF are based on risk assessment and are informed by the recommendations in the World Organisation for Animal Health (OIE) *Terrestrial animal health code* (Chapter 15.1) and the OIE *Manual of diagnostic tests and vaccines for terrestrial animals* (Chapter 3.8.1). The strategies and policy guidelines are for emergency situations, and are not applicable to policies for imported animals or animal products.

This manual has been produced in accordance with the procedures described in the AUSVETPLAN **Overview document**, and in consultation with Australian national, state and territory governments; the relevant livestock industries; nongovernment agencies; and public health authorities, where relevant.

In this manual, text placed in square brackets [xxx] 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.

1.2 Other documentation

This response strategy should be read and implemented in conjunction with:

- other AUSVETPLAN documents, including the operational, enterprise and management manuals, and any relevant guidance and resource documents; the complete series of manuals is available on the Animal Health Australia website¹
- relevant nationally agreed standard operating procedures (NASOPs).² These procedures complement AUSVETPLAN and describe in detail specific actions undertaken during a response to an incident. NASOPs have been developed for use by jurisdictions during responses to emergency animal disease (EAD) incidents and emergencies
- relevant jurisdictional and industry policies, response plans, standard operating procedures and work instructions
- relevant Commonwealth, and state and territory legislation and legal agreements (such as the Emergency Animal Disease Response Agreement,³ where applicable).

1.3 Training resources

1.3.1 EAD preparedness and response arrangements in Australia

The EAD Foundation Online course⁴ provides livestock producers, veterinarians, veterinary students, government personnel and emergency workers with foundation knowledge for further training in EAD preparedness and response in Australia.

¹ www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents

² www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/nationally-agreed-standardoperating-procedures

³ www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ead-response-agreement

⁴ www.animalhealthaustralia.com.au/emergency-animal-disease-training-program

2 Nature of the disease

African swine fever (ASF) is a contagious disease of pigs that may result in high or low case mortality rates, fever, hyperaemia of the skin and a variety of other clinical signs, including incoordination, diarrhoea and pneumonia.

It is clinically indistinguishable from classical swine fever (CSF), and similar lesions are seen at postmortem examination. The diagnosis needs to be confirmed by identification and characterisation of the causative virus.

OIE listing

ASF is a World Organisation for Animal Health (OIE)–listed disease.⁵

2.1 Aetiology

The causative agent of ASF is ASF virus, an enveloped, double-stranded DNA virus. It is classified as an asfivirus, the only member of the family *Asfarviridae*. ASF virus is the only DNA virus known to be transmitted by arthropods.

ASF virus isolates can be characterised into more than 20 different genotypes reflecting their geographical relatedness. Although genotype does not usually indicate virulence (Malogolovkin et al 2015, Beltrán-Alcrudo et al 2017), genotype 2 strains are typically associated with higher virulence.

2.2 Susceptible species

All Suidae may be susceptible to infection, but disease is associated with domestic and feral pigs (*Sus scrofa*), and the Eurasian wild boar (*Sus scrofa scrofa*) (Beltrán-Alcrudo et al 2017).

In Africa, the African warthog (*Phacochoerus aethiopicus and P. africanus*), African bush pig (*Potamochoerus porcus*) and African giant forest hog (*Hylochoerus meinertzhageni*) are important in the epidemiology of ASF because they can be subclinically infected and may act as reservoirs of infection (Beltrán-Alcrudo et al 2017). The Timorese warty pig (*Sus celebensis timoriensis*) is also susceptible to infection with ASF virus, and may enable the disease to be maintained on Timor-Leste (Grant Rawlin, Adjunct Professor Veterinary Science, AgriBio, La Trobe University, pers comm, 2019).

Although there are differing reports on the susceptibility of South American peccaries (in particular, the collared peccary – *Pecari tajacu*, and the white-lipped peccary – *Tayussu pecari*) to infection and disease (Viñuela 1985), they are considered not susceptible to infection and therefore not important in disease spread (Spickler 2018).

⁵ OIE-listed diseases are diseases with the potential for international spread, significant mortality or morbidity within the susceptible species, and/or potential for zoonotic spread to humans. OIE member countries that have been free from a notifiable disease are obliged to notify the OIE within 24 hours of confirming the presence of the disease.

Zoonotic potential

ASF is not zoonotic.

2.3 World distribution

ASF is endemic in most of sub-Saharan Africa. In the latter half of the 20th century, ASF was reported in parts of South and Central America, and Europe. The disease has since been eradicated from most of these countries, but remains endemic in feral pigs in Sardinia (an island of Italy).

Since 2007, ASF has become endemic in parts of eastern Europe and western Asia. In 2018, ASF was reported for the first time in China and recurred in western Europe. ASF continues to spread worldwide.

Genotype 1 strains have been associated with disease in Sardinia, and genotype 2 strains have been associated with the epizootics in Europe and Asia. The remaining genotypes are associated with disease in Africa.

For the latest information on the distribution of ASF, refer to the OIE World Animal Health Information database.⁶

Occurrence in Australia

There have been no outbreaks of ASF in Australia.

2.4 Epidemiology

2.4.1 Incubation period

The incubation period for ASF is quoted in the literature as 4–19 days (Beltrán-Alcrudo et al 2017) and may be less than 5 days after exposure to ticks (Spickler 2018).

OIE incubation period

For the purposes of the OIE *Terrestrial animal health code*, the incubation period⁷ for ASF is 15 days (which is used for the purposes of this manual).

2.4.2 Persistence of agent and modes of transmission

General properties

ASF virus is an enveloped virus and is stable at a wide range of pH levels in serum-free medium (approximately pH 3.9–11.5); serum increases the stability of the virus (OIE 2018a). The virus remains viable when frozen but is inactivated by heat.

⁶ <u>www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home</u>

⁷ In the OIE *Terrestrial animal health code*, 'incubation period' means the longest period that elapses between the introduction of the pathogenic agent into the animal and the occurrence of the first clinical signs of the disease. See <u>www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm</u>.

Beltrán-Alcrudo et al (2017) proposed exposure to sunlight as a means of decontaminating equipment that cannot be decontaminated by other means; however, they did not provide guidance on recommended time periods to inactivate ASF virus using this exposure.

Survivability of ASF virus has been recorded in a number of different substrates, including those shown in Table 2.1.

Substrate	Detection times Detected infectious Georgia 2007/1 ASF virus up to 9 days at 4 °C; 4 days at 37 °C (Davies et al 2017)		
Faeces			
Urine	Detected infectious Georgia 2007/1 ASF virus up to 15 days at 4 °C, 3 days at 37 °C (Davies et al 2017)		
Blood	Detected infectious Georgia 2007/1 ASF virus up to 13 days (Guinat et al 2014)		
Nasal and rectal swabs	Occasionally isolated infectious Georgia 2007/1 ASF virus (Guinat et al 2014)		
Oral swabs	Negative to Georgia 2007/1 ASF virus (Guinat et al 2014)		
Oral fluid	Occasionally isolated ASF virus (but it was not infectious) collected via ropes (Guinat et al 2014)		
Semen	Not confirmed (Thacker et al 1984)		

Table 2.1	Survivability of	f African swine	fever virus in	different substrates
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Effective times and temperatures for inactivation of viruses vary, and may depend on the type of product being treated, the type of equipment, the type of heat being used (dry vs wet) and the initial viral titre. An assessment specific to the product type should be undertaken before recommending a heat treatment.

The inactivation processes in the following sections, and Table 2.2, are taken from the OIE *Terrestrial animal health code*, Chapter 15.1 (OIE 2018b).

Commodity	Inactivation process	
Laboratory setting	56 °C for 70 minutes	
	60 °C for 20 minutes	
Meat and meat products	Heat treatment 30 minutes at a minimum temperature of 70 °C, which should be reached throughout the meat, or an equivalent heat treatment that has been demonstrated to inactive ASF	
	virus in meat	
	Dry cured pigmeat	
	Curing with salt and drying for a minimum of 6 months	

Table 2.2	Inactivation	processes for	African swine	fever virus

Commodity	Inactivation process		
Casings	Treating for at least 30 days either with dry salt (NaCl) or with saturated brine (Aw <0.80), or with phosphate- supplemented dry salt containing 86.5% NaCl, 10.7% Na ₂ HPO ₄ and 2.8% Na ₃ PO ₄ (weight/weight/weight) at a temperature of 12 °C or above		
Hides, skins and trophies	Boiling in water for a time that ensures that any matter other than bone, tusks or teeth is removed OR		
	Soaking, with agitation, in a 4% (w/v) solution of washing soda (sodium carbonate, Na_2CO_3) maintained at pH 11.5 or above for at least 48 hours		
	OR Soaking, with agitation, in a formic acid solution (100 kg salt (NaCl) and 12 kg formic acid per 1000 L water) maintained below pH 3.0 for at least 48 hours; wetting and dressing		
	agents may be added		
	In the case of raw hides, treating for at least 28 days with salt (NaCl) containing 2% washing soda (sodium carbonate, Na ₂ CO ₃)		
	OR		
	Treating with 1% formalin for a minimum of 6 days		
Bristles	Boiling for at least 30 minutes		
	OR		
	Immersing for at least 24 hours in a 1% solution of formaldehyde		
Litter and manure from pigs	Moist heat treatment for at least 1 hour at a minimum temperature of 55 °C		
	OR		
()	Moist heat treatment for at least 30 minutes at a minimum temperature of 70 °C		
Swill ^a	Maintaining at a temperature of at least 90 °C for at least 60 minutes, with continuous stirring		
	OR		
	Maintaining at a temperature of at least 121 °C for at least 10 minutes at an absolute pressure of 3 bar		
	OR		
	Subjecting to an equivalent treatment that has been demonstrated to inactivate ASF virus		

a The feeding of swill (referred to as prohibited pig feed in Australian legislation) to pigs is well recognised as a significant risk factor for the introduction and spread of many emergency animal diseases, including African swine fever. In Australia, food substances that should not be fed to pigs include all meat and meat products, and any food that has come in contact with meat.

ASF virus has been reported as being susceptible to a range of disinfectants (Plowright et al 1994; Krug et al 2012; OIE 2018a, Juszkiewicz et al 2019). Information on chemical agents and relevant

concentrations for inactivation of ASF virus can be found in the Australian Pesticides and Veterinary Medicines Authority (APVMA) permit 88135.

Environment (including windborne spread)

In one study, pigs that were introduced into pens that had been vacated by ASF virus—infected pigs for 3, 5 and 7 days did not develop clinical signs of ASF, and viral DNA was not detected in the introduced pigs from blood samples taken over the following 3 weeks. During the time the ASF virus—infected pigs were in the pens, faeces and wet bedding were removed each day except on the day of their euthanasia (Olesen et al 2018a). Other studies have shown that ASF virus can remain viable for much longer under most environmental conditions (days to months, depending on substrate and temperature); the virus remains viable for longer in body excretions and secretions, and at lower temperatures (Muller 1973, cited in Haas et al 1995; Sánchez-Vizcaíno et al 2012). It is not inactivated by freezing and thawing.

Contact with contaminated water (eg from dumping of infected carcasses into waterways) has been speculated to contribute to spread of ASF in some countries (McCullough 2018). Although ASF virus may remain viable in water, it is likely to be rapidly diluted in large bodies of water and is not expected to be present at infective levels (Beltrán-Alcrudo et al 2017).

Aerosols may play a role in transmission within herds (aerosol infection can occur over distances up to about 2–3 metres), but windborne spread is not considered likely to contribute to spread of ASF virus between herds (Beltrán-Alcrudo et al 2017, Olesen et al 2017).

Susceptible animals

Live animals

ASF virus may spread to pigs through sylvatic and tick-pig cycles (see 'Arthropod vectors', below). Direct and indirect mechanisms (eg biting insects) may spread the virus between domestic pigs and between herds. The primary route of infection is oronasal.

Results from a number of experimental and field studies support the finding that the overall rate of spread of outbreaks of ASF is constant, but relatively slow (Schulz et al 2019).

Movement of infected pigs is the most important means of spread between piggeries. Spread can also occur by the movement of carcasses, contaminated products (as swill), aerosols, mechanical vectors and fomites (including feed, vehicles, equipment, clothing, people and insects). Within herds, direct contact with the excretions and secretions of infected pigs, and ingestion of contaminated products, are the main mechanisms of spread (Beltrán-Alcrudo et al 2017, Olesen et al 2017).

Infected pigs shed virus in all secretions and excretions, particularly blood, as well as saliva, lacrimal discharges, nasal discharge, faeces, urine and secretions from the genital tract (Gabriel et al 2011, Beltrán-Alcrudo et al 2017, Sánchez-Cordón et al 2018). Virus could also be detected in air samples collected in rooms with experimentally infected pigs from day 4 post-inoculation to day 70 post-inoculation (de Carvalho Ferreira et al 2013).

Viral shedding reportedly occurs up to 2 days before clinical signs of disease appear (Penrith & Vosloo 2009, Beltrán-Alcrudo et al 2017). The reported period of shedding following infection varies from up to 1 month (Wilkinson 1986) to more than 70 days (Beltrán-Alcrudo et al 2017, Petrov et al 2018).

Animals surviving ASF infection may have ASF virus persisting for prolonged periods in tissues or blood; these animals are known as carriers. Carriers may remain persistently infected for 6 months or more (Wilkinson 1984, Oura et al 2005). Pregnancy does not appear to cause reactivation of virus excretion.

There is no reliable evidence of transmission from sows to fetuses (Penrith et al 2004).

Live wild (including feral) animals

Wild boar have been associated with disease overseas. Feral pig populations may serve as reservoirs of infection, with the possibility of secondary spread to domestic pigs.

Carcasses

ASF virus persists in blood and tissues for long periods after death. It is not inactivated by postmortem changes in pH, autolysis or putrefaction (Beltrán-Alcrudo et al 2017).

Probst et al (2017) suggested that the behaviour of wild boar towards carcasses of their conspecifics may contribute to the spread of disease. They found that, in Germany, rooting and foraging behaviours around and underneath deceased animals are more likely to contribute to disease transmission to susceptible wild boar than scavenging. Wild boar, regardless of their age, were possibly more interested in soil surrounding and underneath the carcasses than in the carcasses themselves. These authors also indicated that ASF virus transmission from contact with an infected carcass does not necessarily occur within the first days after the death of an infected wild boar, but may occur from carcasses in a more advanced state of decomposition.

Carcasses of pigs that die during the acute phase of ASF contain more virus, and therefore are more infective to other pigs, than carcasses of chronic carriers of ASF.

Dead pigs drifting onto shore in China (FAO 2019a) and Taiwan (FAO 2019b) have tested positive to ASF virus with 100% sequence matching to the ASF virus in mainland China. Accordingly, dead pigs and pig products that wash up onto Australian shores from infected countries represent a potential pathway of introduction to feral pigs that may scavenge them, or root and forage in contaminated soil and material around and under them.

Animal products

Meat and meat products, casings - including use as animal feed

ASF virus can remain viable for many months in a protein environment, such as raw, unprocessed, frozen meat (Penrith & Vosloo 2009). The virus has been recovered after 150 days from contaminated meat kept at 4 °C, after 104 days from meat kept at -4 °C, and after 188 days from bone marrow stored at -4 °C (MacDiarmid 1991). Dee et al (2018) simulated the intercontinental transport of ASF virus–contaminated materials, including moist cat and dog food and pork casings, and found that ASF virus remained viable following the 37-day trial at both 4– 14 °C and 10–20 °C. Other studies have shown that ASF virus is sensitive to some combined treatments of heat, alkaline pH and peroxide that could be used in the production of spray-dried porcine plasma (SDPP, which is used in the production of some animal feeds) (Kalmar et al 2018).

Brining alone is insufficient to inactivate ASF virus in hams. The virus has been recovered from processed hams after 5 months of storage and from the bone marrow of processed hams stored for 6 months (McDaniel 1980). However, cooking pork to a well-done stage may inactivate the virus, provided it has been heated throughout to 100 °C for at least 30 minutes. Although dry-cured hams are not cooked, the amount of ASF virus in Parma, Serrano and Iberico hams dry-

cured under specific conditions is significantly reduced by the 9–12-month curing process (Mebus et al 1997).

Viable virus has been recovered from putrefied serum stored at room temperature for 15 weeks, and from blood stored at 4 °C for 18 months to 6 years (EFSA 2009, Sánchez-Vizcaíno et al 2012).

In the Belgian outbreak in 1985 (Biront et al 1987), the European Union required that pigmeat produced in the infected area be placed in hermetically sealed containers and held at a temperature of at least 60 °C for 4 hours, with at least 30 minutes of this period above 70 °C.

Animal byproducts

Hides, skins and trophies

ASF virus may be present in bristles and skin (including trophies) from infected pigs.

ASF virus in bristles may be inactivated by boiling for at least 30 minutes or immersion for at least 24 hours in a 1% solution of formaldehyde (OIE 2018b).

ASF virus in skins may be inactivated by:

- boiling in water for long enough that matter other than bone, tusks and teeth are removed
- soaking with agitation in a 4% (w/v) solution of sodium carbonate (washing soda) maintained at pH 11.5 or above for at least 48 hours
- soaking with agitation in a formic acid solution (100 kg salt and 12 kg formic acid per 1000 L of water) maintained below pH 3.0 for at least 48 hours (wetting and dressing agents may be added)
- treating raw hides for at least 28 days with salt containing 2% sodium carbonate (washing soda), or treating with 1% formalin for a minimum of 6 days (OIE 2018b).

Swill

Ingestion of pigmeat or pigmeat products infected with ASF virus is an important means of spread, especially in the first outbreak in a country. Many ASF outbreaks that have occurred in ASF-free countries or zones were caused by feeding waste food products derived from infected pigs to domesticated pigs (Sánchez-Vizcaíno 2010). The first cases of ASF in Malta, Brazil and Sardinia were in swill-fed pigs close to international airports or seaports. The 2007 introduction of ASF to Georgia is thought to have occurred from feeding waste at international harbours as swill (Rowlands et al 2008, cited in Schulz et al 2017).

The OIE (OIE 2018b) states that ASF virus in swill may be inactivated by:

- maintaining the swill at a temperature of at least 90 °C for at least 60 minutes, with continuous stirring
- maintaining the swill at a temperature of at least 121 °C for at least 10 minutes at an absolute pressure of 3 bar
- subjecting the swill to an equivalent treatment that has been demonstrated to inactivate ASF virus.

Note: The nationally agreed prohibited pig feed definition lists 100 °C for 30 minutes as an approved process for treatment of swill.

Semen and embryos from live susceptible animals

The survivability of ASF virus in semen was not confirmed by Thacker et al (1984). Although transmission of ASF virus by artificial insemination is thought to occur, it has not been proven (Beltrán-Alcrudo et al 2017). The OIE recommends measures for ASF virus for importation of porcine genetic material, suggesting that the risk of transmission is not negligible from these products.

The International Embryo Transfer Society has indicated that there is not enough information to reach a conclusion regarding the risk of transmission of ASF virus via embryos.

Specimens

ASF virus may remain viable in laboratory specimens (eg frozen tissue samples from infected animals). However, these are not expected to play a role in the transmission of ASF and do not pose a public health risk.

Waste products and effluent

The survivability of ASF virus in the environment has been reported as being anywhere from 3 days in contaminated pens (Olesen et al 2018a) to 60–100 days in faeces (Muller 1973, cited in Haas et al 1995), and at least 30 days in contaminated pig pens (Sánchez-Vizcaíno et al 2012). The longer time periods reported are consistent with field observations suggesting that the virus remained viable on premises for 3 months or longer.

Other research has found that ASF virus may remain viable and infectious in faeces and urine for 9 and 15 days at 4 °C, and 4 and 3 days at 37 °C (Davies et al 2017).

ASF virus can be inactivated in liquid media by heating at 60 °C for 30 minutes (MacDiarmid 1991). It can be inactivated in litter and manure by moist heat treatment for at least 1 hour to a minimum temperature of 55 °C, or for at least 30 minutes to a minimum temperature of 70 °C (OIE 2018b).

Equipment, including personal items

Transfer of ASF virus by fomites, including bedding, feed, equipment, clothes and footwear, is a proven method of spread of ASF (Penrith & Vosloo 2009). People – especially those handling pigs or pig products (eg farm workers, abattoir workers, veterinarians) – veterinary instruments (especially hypodermic needles) and vehicles that have carried infected pigs have all been implicated in transfer of virus (Wilkinson 1986).

Krug et al (2018) explored the disinfection of ASF virus from steel, plastic and concrete surfaces, which are commonly found in pork packing plants. They found that the presence of dried blood on equipment strongly inhibited the action of sodium hypochlorite. This reinforces the need for adequate cleaning of surfaces to remove organic material before disinfection is undertaken.

Arthropod vectors

In Africa, ASF virus is maintained in a sylvatic cycle involving warthogs and soft argasid ticks of the *Ornithodoros moubata* complex (which are found in warthog burrows). Transstadial and transovarial transmission of the virus occurs in these ticks (Bellini et al 2016, Spickler 2018). Transmission between *O. moubata* complex ticks and domestic pigs is also known to occur in parts of Africa (as a tick–pig cycle). The same may apply to transmission of ASF virus in wild boar in Europe (Costard et al 2013; Guinat et al 2016a, cited in Schulz et al 2017). *Ornithodoros* ticks

play an important role in maintaining infection but are not thought to contribute to the geographical spread of the virus (Bellini et al 2016).

On the Iberian Peninsula, the soft tick *Carios erraticus* contributed to transmission of the disease in outdoor pig production systems and served as a reservoir of virus for 1 year in previously infected areas that had been depopulated. This resulted in persistence of the virus for 5 years (Boinas et al 2011). Transstadial, but not transovarial, transmission has been demonstrated in *C. erraticus* (EFSA 2010).

The role of soft ticks in other regions is either less important or has not been demonstrated. The only *Ornithodoros* ticks present in Australia are the inornate kangaroo tick (*O. gurneyi*) and the penguin tick (*O. capensis*), neither of which is known to feed on pigs.

Although the ornate kangaroo tick (*Amblyomma triguttatum*) is known to be found on pigs, there is no evidence that hard ticks such as this are involved in transmission of ASF virus (de Carvalho Ferreira et al 2014, Spickler 2018).

Bloodsucking insects such as mosquitoes and biting flies (*Stomoxys calcitrans*) feeding on viraemic pigs may be involved in the mechanical spread of ASF within herds, and possibly between herds as a result of their flight range of 3.2 km. Such insects can carry high levels of virus for 2 days (Mellor et al 1987, cited in Beltrán-Alcrudo et al 2017). *S. calcitrans* is capable of transporting infectious virus for at least 12 hours; DNA can be detected in fly bodies up to 36 hours post-feeding (Olesen et al 2018b).

Oleson et al (2018c) found that, in addition to *S. calcitrans* acting as a mechanical vector of ASF virus (Mellor et al 1987), infection may also occur in pigs orally ingesting flies fed ASF virus– contaminated blood. Ingestion of 20 blood-fed flies was successful in transmitting the disease.

S. calcitrans is able to travel 3.2 km in search of a blood meal (Bailey et al). The fly's pattern of interrupting its feeding and moving between host animals would increase the efficiency with which pathogens are spread between farms in close (<3 km) proximity.

People

ASF is not zoonotic, but people may aid the mechanical transmission of ASF virus between pigs by the movement of contaminated clothing, footwear, equipment and so on, as well as on the skin (including nasal passages) of people.

2.4.3 Factors influencing transmission

In Europe, ASF was reported to spread at a rate of approximately 1–3 km per month in wild boar (ProMED-mail 2019), but it is not known if this is relevant under Australian conditions. Humanassociated movements of infected suids and/or contaminated pork products, and subsequent feeding to pigs in Europe and China are believed to have contributed to the spread of ASF over large distances in short timeframes.

Transmission appears to be less effective by indirect contact than by direct contact with infected animals (Pietschmann et al 2015, Guinat et al 2016a,b, all cited in Schulz et al 2017).

The host species may also affect transmission, as concentrations of ASF virus in body secretions and excretions are reportedly lower in warthogs than in pigs (Spickler 2018).

2.5 Diagnostic criteria

2.5.1 Clinical signs

ASF is a highly variable disease, with several forms. The variability is largely due to differences in virulence among the many strains of the virus but may also be influenced by host age, the amount of inoculum and the level of herd immunity.

Clinical findings of the various forms of the disease are as follows:

Peracute form

• pigs found dead with no prior clinical signs

Acute form

- mortality rate of up to 100% across age groups
- clinical duration 1–7 days
- fever up to 42 °C
- hyperaemia or cyanosis of extremities, particularly ears and snout
- loss of appetite or irregular appetite
- inability or unwillingness to stand up, or convulsions
- incoordination or stiff gait
- huddling together or piling on top of each other
- laboured breathing or coughing
- dysentery or diarrhoea
- conjunctivitis
- mucopurulent nasal discharge
- vomiting
- abortion

Subacute form

- clinical signs as for the acute form, but generally milder and persisting longer (3-4 weeks)
- case mortality rate lower than for acute form (in the order of 30–70%), with deaths more likely in younger pigs
- fever, which may fluctuate irregularly and may exceed 40.5 °C
- occasionally, a purple colour over the pig's surface (due to haemorrhages in the skin)
- bleeding from injection sites
- abortion

Chronic form (generally seen in pigs surviving the subacute form)

- recurrent transient fever
- ill-thrift (failure to thrive), stunting and emaciation
- pneumonia (laboured breathing or coughing)

- arthritis
- cutaneous ulcers
- death, often due to secondary bacterial infections, or associated with pregnant, young or otherwise immunocompromised animals

Pigs that survive infection may become chronic subclinical carriers (Eblé et al 2019).

2.5.2 Pathology

Gross lesions

Acute form

Findings include:

- enlarged and haemorrhagic lymph nodes, often resembling blood clots; the gastrohepatic, renal, mesenteric and submandibular lymph nodes are most often affected
- enlarged spleen (2–3 times its normal size), which may be necrotic, dark, friable or pulpy
- haemorrhages in almost any organ; they are most commonly seen on serosal membranes and in kidneys (as subcapsular petechiae), heart, urinary bladder, lung and gall bladder
- septal oedema of lungs, resulting in prominent interlobular septa
- fluid in body cavities.

Subacute form

Findings are more variable than for the acute form and include:

- haemorrhage of the intestinal lining, lymph nodes and kidney
- enlarged but not congested spleen
- lobular consolidation of cranial lung lobes.

Chronic form

Findings include:

- enlarged lymph nodes
- fibrinous pericarditis and pleurisy
- lobular consolidation of lungs, which may progress to lobular necrosis
- small, hard, nodular white masses in lungs
- arthritis
- cutaneous ulcers
- poor body condition.

Microscopic lesions

Extensive necrosis of lymphatic tissue is common, and may be accompanied by haemorrhage and karyorrhexis of granular lymphocytes (nuclear fragmentation and degeneration). Necrosis is more severe and frequent with ASF than with CSF. There is vasculitis, with degeneration of endothelium and fibrinoid degeneration of artery walls in all organs. There is nonsuppurative inflammation of the brain, spinal cord and spinal nerves.

Pathogenesis

The pathogenesis of ASF virus was reviewed by Blome et al (2013). In pigs, the virus replicates in the mononuclear phagocyte system,⁸ particularly in monocytes and macrophages, and massive destruction of macrophages is thought to play a major role in the pathogenesis of the disease. Different virus isolates show no general differences in cell tropism or organ distribution; however, a significant increase in the severity of tissue destruction is seen with increasing virulence (Oura et al 1998, cited in Blome et al 2013).

2.5.3 Differential diagnosis

The following diseases and conditions should be considered in a differential diagnosis of ASF:

- CSF
- Aujeszky's disease
- erysipelas
- salmonellosis
- various poisons, including warfarin
- pasteurellosis/pneumonia
- mulberry heart disease
- isoimmune thrombocytopenia purpura
- viral encephalomyelitis.

2.5.4 Laboratory tests

Because of the considerable overlap in the clinical and pathological signs seen in ASF and in many other pig diseases, the diagnosis needs to be confirmed by identification and characterisation of the causative virus. Relevant laboratory tests should also be performed to exclude the principal differential diagnoses.

If an outbreak is confirmed to be caused by ASF virus, regulatory requirements (eg for handling and reporting) apply because this agent is classified as a Security Sensitive Biological Agent (SSBA).⁹ However, emergency situations, including emergency animal disease outbreaks, can be exempted from some SSBA regulatory requirements. Clarification should be sought from the SSBA officer at the facility concerned.

Samples required

Specimens required for detection and characterisation of the agent, serological testing and histopathology are as follows:

- identification of agent
 - whole blood from live, suspect animals in EDTA anticoagulant
 - unpreserved tissues collected aseptically at postmortem tonsils, spleen, lymph nodes (gastrohepatic, mesenteric), lung, kidney and ileum

⁸ Previously known as the reticulo-endoethelial system

⁹ www.health.gov.au/SSBA

- tube/swab-based sampling systems such as PrimeStore or Genotube can also be used
- serological testing
 - sera from animals suspected of having subacute or chronic disease
- histopathology
 - a full range of tissues in neutral-buffered formalin.

Tissue samples should be taken from affected pigs that have been killed and from pigs that have recently died. To minimise the risk of contamination, tissue samples should be taken as aseptically as possible and without delay during necropsy.

Sampling feral pigs

Sampling wild or feral animals can present a number of challenges that make the usual approach to sampling impracticable. Remote locations, lack of a cold chain, animals found dead and untrained operators are all potential limitations. A number of alternative approaches are possible to ensure that testing can proceed under challenging circumstances.

Tube/swab-based sampling systems such as PrimeStore or Genotube are available, as are paperbased approaches such as FTA cards and 3MM filter paper (Braae et al 2013). Sampling of blood or peritoneal fluid from animals found (recently) dead or shot is expected to be sufficient to detect acute infection.

Conventional approaches to sampling, if possible, are always preferred. The alternative methods have been shown to perform adequately in surveillance of wild suids in a number of countries (Randriamparany et al 2016, Carson et al 2018), but lack the full validation of conventional methods and may lack some sensitivity in practice. Tube/swab-based approaches are considered preferable from the laboratory perspective; card-based methods, in particular, are not well suited to high-volume testing.

It is important to be aware that, although some of these sampling systems claim inactivation of the agent (some do not), this capability should not be assumed to be 100% effective. Adequate biosecurity measures must be taken in transporting all samples, regardless of whether the sampling system claims inactivation.

Transport of specimens

Specimens should be submitted in accordance with agreed state or territory protocols. Specimens should initially be forwarded to the state or territory laboratory for appropriate analysis, and assessment of whether further analysis will be required by the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), Geelong.

If the state or territory laboratory deems it necessary, duplicate samples of the specimens should be forwarded to CSIRO-AAHL for emergency disease testing, after the necessary clearance has been obtained from the chief veterinary officer (CVO) of the state or territory of the suspect case, and after the CVOs of Victoria and Australia have been informed about the case and the transport of the specimens to Geelong (for the first case). Sample packaging and consignment for delivery to CSIRO-AAHL should be coordinated by the relevant state or territory laboratory.

For further information, see the AUSVETPLAN management manual Laboratory preparedness.

Packing specimens for transport

Blood samples and unpreserved tissue specimens should be chilled and transported with frozen gel packs. For further information, see the **AUSVETPLAN management manual** *Laboratory preparedness*.

Laboratory diagnosis

The initial approach to ASF diagnosis is screening by real-time PCR (qPCR), as this method is rapid and sensitive, and can be scaled up readily if required. An antigen ELISA is also available, although rarely used. Virus isolation will be attempted. Further characterisation and genotyping by sequence analysis can be carried out on primary samples or on isolates.

Serology is also available. Although serology generally plays a minor role in the initial diagnosis, it is likely to be used to define the nature and extent of any outbreak, and in the proof-of-freedom phase.

LEADDR

The role of the Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) network is to provide frontline screening capability at jurisdictional laboratories. The network will also play a role in reviewing initial and ongoing laboratory findings, including test results, and providing advice to the Consultative Committee on Emergency Animal Diseases and its working groups on follow-up laboratory needs and strategies.

CSIRO-AAHL tests

The testing algorithm used by CSIRO-AAHL is shown in Figure 2.1. Further details of tests currently available at CSIRO-AAHL are shown in Table 2.3.

Figure 2.1 The current approach to diagnostic testing at CSIRO-AAHL



AAHLASF Testing Algorithm

¹ Ideally EDTA Blood or postmortem samples (spleen, lymph node, tonsil, kidney). Other possible samples include tissue or swab based sampling systems such as PrimeStore or Genotubes, or paper based approaches such as FTA cards and 3-MM filter paper.

Test	Specimen required	Test detects	Time taken to obtain result
Agent detection			
qPCR	EDTA blood/tissue	Viral genome	<1 day
Virus isolation	EDTA blood/tissue	Virus	1–2 weeks
ELISA	EDTA blood/tissue	Antigen	1 day
Agent characterisation			
PCR and sequencing (genotyping)	EDTA blood/tissue/virus isolate	Viral genome	2–3 days
Serology			
ELISA	Serum	Antibody	1 day
IFAT	Serum	Antibody	1 day

Table 2.3 Laboratory tests currently available at CSIRO-AAHL for diagnosis of African swine fever

EDTA = ethylenediaminetetraacetic acid; IFAT = immunofluorescent antibody test; PCR = polymerase chain reaction; qPCR = real-time PCR

Source: Information provided by CSIRO-AAHL, 2019 (refer to CSIRO-AAHL for most up-to-date information).

2.6 Resistance and immunity

The large variation in the clinical and pathological picture in different parts of the world is mainly due to variations in virulence of different strains of the virus, rather than to differences in the immune status of the pig population. For example, the Netherlands '86 genotype has a survival rate of approximately 30%, whereas genotype 2 circulating in Europe has close to 100% mortality.

Pig populations that have not been exposed to ASF virus previously are likely to be fully susceptible. Two types of 'survivor' pigs have been identified:

- pigs that do not die from infection but develop a persistent infection
- pigs that clear the infection independently of virulence of the virus and do not become persistently infected, and thus do not shed the virus for long periods of time; although localised virus persistence in lymphoid tissues may occur in these pigs, it is unlikely that they will present a high enough virus dose for oral infection (Ståhl et al 2019).

Populations of domestic pigs have been found with greater resistance than others to the pathogenic effects of virulent ASF virus following exposure (Penrith et al 2004). However, the resistance may not be genetically based but may be associated with epidemiological factors and genotype of the virus in the area of origin of the pigs. Approximately 40% of the pig population surveyed in Mozambique demonstrated some degree of innate resistance, with a broad range of variation (Penrith et al 2004).

2.7 Vaccination

There is currently no commercially available vaccine for ASF. This is primarily due to the complexity of the immune response to this virus (EFSA 2009).

2.8 Treatment of infected animals

There is no effective treatment for infected animals. Palliative treatment may alleviate the clinical signs but will not prevent the spread of infection and may make the detection of infected animals more difficult.

2.9 Control overseas

In Malta and the Dominican Republic, ASF was eradicated by the total elimination of pigs from the two countries (Geering et al 1995).

Other measures used for successful eradication overseas have included slaughter of infected and in-contact animals, safe carcass disposal, disinfection of affected premises and contaminated items, quarantine and movement controls, and prevention of contact between wild suids and domestic pigs. Destruction of contaminated pig pens has also been used.

Preventive measures to mitigate the spread of ASF in pig farming systems were reviewed by Bellini et al (2016). The study identified the following disease pathways of transmission for ASF:

- direct pig-to-pig contact
- consumption of contaminated feed (swill feeding)
- vehicles and other fomites, such as clothing, footwear and surgical equipment
- workers and visitors
- slurry
- genetic materials
- bites from ticks.

To address and mitigate these disease pathways, the following measures have been used in eradication programs:

- physical isolation of infected herds
- appropriate movement controls on animals, products, people, vehicles, equipment and so on
- appropriate disposal of carcasses, manure, bedding material and slurry
- ban on swill feeding.

Where ASF virus was present in ticks (on the Iberian Peninsula), eradication from domestic pig populations took decades. Housing of pigs that was identified to contain infected ticks was destroyed or isolated as part of this eradication campaign (Spickler 2018).

In the 2018 outbreak in the Czech Republic, authorities managed to prevent introduction of ASF to their domestic pig population, and control and eradicate the disease from wild boar. Measures implemented included compulsory notification of all dead pigs in the infected area, movement controls, a ban on backyard pigs in the infected area, active search and removal of wild boar carcasses, intensive hunting of wild boar by trained hunters, laboratory investigation of all dead and hunted wild boar, and safe disposal of dead wild boar using rendering (Czech Republic State Veterinary Administration 2018).

EFSA AHAW Panel (2018) suggested the use of different wild boar management strategies at different stages of an ASF outbreak. The authors proposed the following:

- In the early stages of an outbreak, keep populations in the infected area undisturbed (eg ban hunting, stop harvesting crops) to minimise dispersal of animals, and drastically reduce the wild boar population in surrounding uninfected areas. Passive surveillance (through collection of carcasses) should be used to monitor the epidemic.
- As the epidemic decreases, reconsider more active population management measures such as culling for population reduction.

3 Implications for Australia

3.1 Potential pathways of introduction

Potential routes for the introduction of African swine fever (ASF) into Australia include the importation or arrival of:

- contaminated pork and pork products
- contaminated porcine genetic material
- contaminated equipment and clothing
- infected pigs or carcasses of infected pigs.

As Australia has strict import conditions in place, the introduction of ASF through the legal importation of these commodities is very unlikely. However, the illegal introduction of contaminated pork and pork products that are illegally (swill) fed to domestic pigs or accessed by feral pigs poses a significant risk.

3.2 Social and economic effects

The economic effects from an incident of ASF in Australia would be due to mortalities, production losses, domestic market disruptions, export market losses and disease control costs. Businesses along the pig production supply chain or in associated industries (eg game-meat industry) would be affected. It has been estimated that total sales revenue losses to the Australian pig industry would be \$409.4 million over 3 years for a single-point outbreak, and \$839.5 million over 5 years for a large multipoint outbreak (ACIL Allen Consulting 2019).

The social impacts of an outbreak may arise from loss of livelihoods, loss of animals, uncertainty around future earnings and the stigma associated with the disease. There will also be concerns about the welfare of affected animal populations and the humaneness of the response measures applied to them. These factors may affect individual mental health and lead to a loss of community cohesion in areas with a heavy reliance on pig production. Indigenous communities that use feral pigs as a source of food may be particularly affected.

3.3 Critical factors for response

The critical factors for a response to ASF in Australia include the following:

- ASF is a highly variable disease. It can vary from disease with high morbidity and high case mortality to a very mild disease.
- Given the similarity of ASF to many endemic diseases, laboratory confirmation is required for diagnosis.
- ASF virus is shed in high concentrations in secretions and excretions containing blood during the acute phase of the disease.
- Pigs infected by mild virus strains or surviving acute disease may shed virus for more than 1 month following recovery.
- All domestic and feral pig species are susceptible to infection in Australia. Suid species kept under zoological conditions may also be susceptible; in this manual, the term 'pig' is used to refer to all susceptible species in Australia.

- Tests are available for rapid detection of ASF, but early diagnosis of an outbreak may be delayed if ASF is present in the mild form, or if initial infections are in small, noncommercial pig herds or feral pigs.
- Transmission of ASF in Australia will most likely occur via the movement of animals, animal products and fomites when this results in contact with other pigs. ASF virus is unlikely to be transmitted over long distances without human assistance.
- No vaccine or effective treatment is available.
- There are no public health implications.
- Movement of the virus by fomites (including trucks) has been proven.
- ASF virus may remain viable for extended periods under some Australian environmental conditions (eg in cooler, wetter areas).
- The persistence of ASF virus in the environment and its potential for reemergence may limit the use of sentinel animals, prevent early restocking after an outbreak and require ongoing monitoring.
- Total cleaning and removal of all animal secretions and excretions (eg faeces, urine, blood) is essential before disinfection begins.
- Aerosols do not play a significant role in disease transmission between herds, but are important for transmission within herds and between animals in close contact.
- Feral pig and smallholder pig populations may not be easily identified or located.
- Any delay in notification from pig owners will lead to delays in response and prolonged response activities.
- Market fluctuations due to public health perceptions or product withdrawals would likely reduce the value of the industry.
- Animal activists may influence public perceptions, which may affect the implementation of control strategies (eg mass destruction of pigs, large burial pits/pyres).
- Trade in animal products will be affected.
- Intensive production systems are prone to rapid overcrowding if output is disrupted, and feed stores may not be adequate for the duration of control; thus, animal welfare implications will need to be considered during movement restrictions on live pigs.
- In some states or geographical areas where there is reliance on a single processing facility, infection at the processing facility or movement restrictions hindering the movement of animals to the facility may result in widespread overcrowding issues.
- Destruction and disposal of culled pigs would require substantial resources and may cause community concerns.
- Loss of animals in herds and zoos may result in loss of important genetics and species.
- Most large abattoirs kill a single species, so accessing pig abattoirs may have some logistical issues because they may not be willing to accept pigs from potentially infected premises. Multispecies domestic abattoirs may also be unwilling to accept pigs during an outbreak. Both of these situations may result in difficulties finding slaughter pathways for some sectors of the industry.

4 Policy and rationale

4.1 Introduction

African swine fever (ASF) is a World Organisation for Animal Health (OIE)–listed disease that has the potential for rapid spread, causing significant production losses. It is of major importance in international trade in pigs and pig products.

4.1.1 Summary of policy

The default policy is to control and eradicate ASF in the shortest possible time, while minimising socioeconomic impacts, using stamping out.

This approach will be supported by a combination of strategies, including:

- an immediate epidemiological assessment of the situation
- rapid recognition and laboratory confirmation of cases
- implementation of legislated declared areas for disease control purposes
- application of biosecurity and movement controls over susceptible animals, animal products and byproducts, and fomites in declared areas to minimise spread of infection
- tracing and surveillance to help determine the source and extent of infection (including, as necessary, in feral pigs)
- valuation, followed by destruction and disposal of pigs, property and things on infected premises (IPs), and of other high-risk pigs, based on a risk assessment
- [disposal of infected pigs, products and byproducts that are not suitable for treatment to inactivate the virus]
- decontamination of IPs and dangerous contact premises (DCPs)
- decontamination and/or disposal of fomites to eliminate the pathogen
- proactive management of animal welfare issues that arise from the disease or the implementation of disease control measures
- surveillance and control of wild animal populations, as appropriate
- surveillance of tick vector populations, if implicated in the epidemiology of the incident
- a public awareness campaign
- industry support to improve understanding of the issues, facilitate cooperation and address animal welfare issues.

Additional measures that may be used, if warranted, to contain and eradicate the outbreak include:

• zoning and/or compartmentalisation.

4.1.2 Case definition¹⁰

For the purpose of this manual, a case of ASF is defined as laboratory-confirmed infection with ASF virus in a pig.

Notes:

- Positive serology in the absence of genome or antigen does not constitute a case but warrants further investigation to determine if there is evidence of infection.
- At the time of an outbreak, revised or subsequent case definitions may be developed (with the agreement of the Consultative Committee on Emergency Animals Diseases CCEAD).

4.1.3 Cost-sharing arrangement

In Australia, ASF is a category 3 emergency animal disease in the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses (EAD Response Agreement).¹¹ When cost sharing of the eligible response costs of an incident is agreed, category 3 diseases are those for which costs will be shared 50% by government and 50% by industry.

4.1.4 Criteria for proof of freedom

Any approach to declaring proof of freedom following an outbreak should be based on the OIE *Terrestrial animal health code* sections on ASF (Chapter 15.1) and animal health surveillance (Chapter 1.4).

See Section 7 for details on establishing proof of freedom.

4.1.5 Governance

Governance arrangements for the response to emergency animal diseases (EADs) are outlined in the **AUSVETPLAN** *Overview document*.

Information on the responsibilities of a state coordination centre and local control centre is available in the AUSVETPLAN management manual *Control centres management (Parts 1 and 2)*.

Disease-specific governance issues

Government environment agencies may be involved in the response, especially if feral pigs are involved in the incident.

The use of the Liaison – Other Agencies function (for liaison with affected Indigenous communities) is also recommended.

¹⁰ AUSVETPLAN case definitions guide when a response to an emergency animal disease (EAD) incident should be undertaken. AUSVETPLAN case definitions do not determine when international reporting of an EAD incident is required.

¹¹ Information about the EAD Response Agreement can be found at <u>www.animalhealthaustralia.com.au/what-we-</u> <u>do/emergency-animal-disease/ead-response-agreement</u>.

4.2 Public health implications

ASF does not affect humans.

4.3 Control and eradication policy

The default policy is to control and eradicate ASF through stamping out and to re-establish the ASF-free status of Australia as quickly as possible. Stamping out will be carried out in association with movement controls, decontamination, and tracing and surveillance, to minimise severe production losses. Zoning and compartmentalisation may be used, where appropriate. The selected strategies will take into account that the disease is spread by direct contact with infected pigs and ingestion of contaminated products, by indirect contact with fomites and mechanical vectors (including insects such as biting flies and mosquitoes) and, in some environments, by biological vectors such as ticks.

Stamping out is preferred because international experience has shown it to be effective, and cost–benefit analyses have shown it to be justified. This strategy also permits a more rapid return to freedom from ASF under the OIE Terrestrial Code guidelines. Eradication can only be achieved if resources are available to eliminate infected domestic and feral pigs as fast as, or faster than, the disease is spreading.

Within this overall policy, the strategies selected will depend on a thorough assessment of the epidemiological situation at the time. They will need to be reassessed during the course of an outbreak and altered if necessary.

4.3.1 Epidemiological assessment

Epidemiological investigation or assessment draws on multiple sources of information to build understanding of the disease and how it is behaving in an outbreak. This, in turn, helps inform response decision making.

In the initial response to ASF, the key objectives for an epidemiological assessment will be to identify the

- spatial distribution of infected and noninfected (domestic and feral) animal populations
- potential vectors involved
- virulence and phylogenetics of the virus strain present (to aid identification of the source)
- source of infection
- pathways of spread and their risk profiles
- likely extent of spread and the size of the outbreak, using modelling where available
- risk factors for the presence of infection, disease spread and susceptibility to disease (eg weather, vectors, feral pig populations, interactions between feral pig populations and kept pig populations).

Epidemiological assessment, and tracing and surveillance activities (see Section 4.3.3) in an EAD response are interrelated activities. Early findings from tracing and surveillance will be inputs into the initial epidemiological assessment (eg considering the spatial distribution of infection). The outcomes of the initial epidemiological assessment will guide decisions on subsequent tracing and surveillance priorities.

The outcomes of the epidemiological assessment will also be used initially to determine the feasibility of eradication versus long-term control and guide the selection of appropriate response measures (eg application of movement controls).

Ongoing epidemiological assessment is important for any EAD response to aid evaluation of the continued effectiveness and value of response measures, and assessment of the progress of disease control measures. The assessment will consider the outcomes of tracing and surveillance activities, and will contribute evidence to support any later claims of disease freedom.

4.3.2 Quarantine and movement controls

Detailed guidelines for classifying (and reclassifying) declared areas and premises are provided in the AUSVETPLAN guidance document *Declared areas and allocation of premises definitions in an EAD response*.

In the response to ASF, biosecurity and movement controls will be immediately imposed on all premises and declared areas on which infection or contamination with ASF virus is either known or suspected.

Controls may be placed on the movement of infected or potentially infected pigs, and contaminated or potentially contaminated things (including pig semen and embryos; pig products and byproducts; vehicles; equipment; people; nonsusceptible animals; crops, grains, hay, silage, and mixed feeds; and effluent).

Section 5 provides details on the use of declared premises and areas, and on reclassifying premises and areas.

Section 6 provides details on movement controls to prevent further spread of ASF virus.

4.3.3 Tracing and surveillance

Guidance on tracing and surveillance can be found in the **AUSVETPLAN guidance document** *Tracing and surveillance*.

Tracing

Rapid trace-forward (spread tracing) and track-back (source tracing) of risk animals and items from IPs will help identify the source of the disease, the primary case(s), and the location of potentially infected animals and contaminated items. This will help identify the origin of the outbreak and define the potential extent of disease spread.

It is important to estimate the date when ASF virus is likely to have been introduced onto each IP, from which forward and backward tracing will be undertaken. In the initial stages of an outbreak, an estimated date of introduction to a premises may not yet have been determined or the epidemiological investigation may be inconclusive. In these cases, tracing should consider movements onto and off IPs from a minimum of 30 days (representing twice the OIE incubation period) before the first appearance of clinical signs on the IP up until the time that effective quarantine was imposed in the IP.

Traces should be prioritised based on a risk assessment, with particular emphasis on the following movements:

• Off the IP (ie trace-forward). This should be for 2 days before the first appearance of clinical signs on the IP for fomites (recognising that animals may shed virus for 2 days before

demonstrating clinical signs) and 15 days (one incubation period) before the first appearance of clinical signs on the IP for live pigs; tracing should cover the period up until the time that effective quarantine was imposed on the IP. Where resources are limited, these periods may be shortened based on a risk assessment. For example, if the date of onset of clinical signs is accurately known, the emphasis will be on trace-forward from 2 days before the onset of the signs. As resources allow, and as a precautionary measure, further trace-forward of live pig movements off theIP for 30 days before the first appearance of clinical signs on the IP up until the time that effective quarantine was imposed on the IP is ideal.

Onto the IP (ie trace-back). This should be for 15 days (one incubation period) before the first appearance of clinical signs on the IP up until the time that effective quarantine was imposed on the IP. Where resources are limited, this period may be shortened based on a risk assessment. For example, if the date of onset of clinical signs is accurately known, the emphasis will be on trace-back from 2 days before the onset of the signs. Trace-back to 30 days before the first appearance of clinical signs on the IP up until the time that effective quarantine was imposed in the IP is ideal.

Tracing¹² should include:

- pigs
- animal products, including meat, offal, skins, hides, semen and embryos, and other porcine products
- wastes and effluent
- vehicles, including livestock transport vehicles, feed trucks, farm visitors' cars, quad bikes, vehicles from utility companies (eg electricity, gas), local government cars (eg rangers), and other rural industry vehicles such as those of forestry contractors
- pig feed, including prohibited pig feed
- other materials, including hay, straw, crops, grains and mixed feed
- people, including people who live on the property, veterinarians, vehicle drivers, artificial insemination personnel, sales and feed representatives, tradespeople, technicians, visitors and other rural industry contractors.

Tracing should include consideration of vector involvement and contact with feral pigs.

Follow-up investigation of premises identified by tracing should be prioritised by the likelihood of transmission and the potential consequences for disease control activities.

Information management systems should be used to support tracing activities, as well as examination of farm records, and interviews with farm workers and/or managers. The PigPass database and documents such as National Vendor Declarations (NVDs) should be used to assist with tracing.

¹² The Australian Government Department of Agriculture, Water and the Environment will work with export establishments to trace relevant exported animals and commodities whose status may be affected by the outbreak. The department will notify importing countries of any affected consignments and manage them as required by the importing government authority.

Surveillance

Surveillance in an ASF outbreak will initially be aimed at:

- identifying the source of infection
- determining the extent of spread, including identifying whether vector and feral pig populations are involved and, if so, their distribution
- providing data to inform risk analyses and selection of appropriate control measures.

The surveillance aims will be achieved by prioritising surveillance:

- of premises where animals are showing clinical signs consistent with ASF (suspect premises (SPs)) and where animals are not showing clinical signs but are considered highly likely to contain an infected animal and/or contaminated animal carcasses, pig products, wastes or things (DCPs)
- of other premises found to be epidemiologically linked to the index case (identified through tracing) to determine if they may be infected and/or contaminated
- to identify premises containing infected animals that have not been identified through tracing, for further investigation and testing.

Field surveillance should be prioritised based on risk, as indicated by the premises classification categories (SPs and DCPs are the highest priority for investigation). Further prioritisation of surveillance should be risk based and take into account the likelihood that subclinical infection may be present, and the risks of further disease transmission and dissemination.

Surveillance in wild animal and vector populations is discussed in Sections 4.3.14 and 4.3.15, respectively.

Section 7 provides further guidance on surveillance for ASF, including recommendations for surveillance on premises of different classifications and to support proof of freedom.

4.3.4 Zoning and compartmentalisation for international trade

Where it is not possible to establish and maintain disease freedom for the entire country, establishing and maintaining disease-free subpopulations, through international and/or domestic zoning and/or compartmentalisation,¹³ may be considered.

In the case of a limited disease outbreak, a containment zone¹⁴ may be established around the areas where the outbreak is occurring, with the purpose of maintaining the disease-free status of the rest of the country outside the containment zone.

All zoning applications would need to be prepared by the Australian Government in conjunction with the relevant jurisdiction(s) and agreed to by the CCEAD. Compartmentalisation applications

¹³ With zoning, disease-free subpopulations are defined primarily on a geographical basis. With compartmentalisation, disease-free subpopulations are defined primarily by management practices (such as a biosecurity plan and surveillance practices of enterprises or groups of enterprises).

¹⁴ The OIE defines a 'containment zone' as an infected zone defined within a previously free country or zone, which includes all suspected or confirmed cases that are epidemiologically linked and where movement control, biosecurity and sanitary measures are applied to prevent the spread of, and to eradicate, the infection or infestation.

would require input from the relevant industries. Recognition of both zones and compartments must be negotiated between the Australian Government and individual overseas trading partners. Zoning and compartmentalisation would require considerable resources that could otherwise be used to control an outbreak. Careful consideration will need to be given to prioritising these activities, because the resulting competition for resources could delay the quick eradication of the disease and recognition of disease freedom.

Agreements between trading partners take time to develop, consider and finalise, because of the need to provide detailed information on activities such as biosecurity, surveillance, traceability and diagnostics to support the approach that is developed. An importing country will need assurance that its animal health status is not compromised if it imports from an established disease-free zone in Australia. Trading partners may not accept a zoning or compartmentalisation proposal, regardless of the information provided. Eradication of disease may be achieved before zoning or compartmentalisation applications are finalised.

The OIE guidelines for zoning and compartmentalisation for ASF are in Chapters 4.4 and 15.1 of the OIE Terrestrial Code.

4.3.5 Biosafety and biosecurity for personnel

Specific biosafety measures are not required for ASF because it is not a zoonotic disease.

Stringent biosecurity measures to manage the movements of people on and off premises will be important for controlling ASF. Movements of personnel onto or off high-risk premises (IPs, DCPs, dangerous contact processing facilities – DCPFs, SPs, and trace premises – TPs) should be limited, where possible.

Personnel involved in handling pigs and/or potentially contaminated items or areas (eg those involved in sampling pigs, or their products or byproducts, or in destruction, disposal and decontamination activities) on high-risk premises (IPs, DCPs, DCPFs, SPs and TPs) should be considered contaminated. These may include response personnel, farm personnel and truck drivers.

All potentially contaminated personnel should shower (including washing hair) before entering and after leaving premises, with complete clothing changes. If showering facilities are not available on-site, showering may occur elsewhere but should occur as soon as practicable after leaving the premises.

Farm-specific boots and overalls should be used. Decontamination of farm-specific footwear after each use and hot laundering (\geq 60 °C) of used overalls is required. These requirements should also be met by workers and drivers entering and leaving processing facilities that handle pigs from IPs, DCPs, SPs and TPs (ie approved processing facilities – APFs, and DCPFs).

On-farm, personnel should work a 'one-way flow' from clean areas to dirtier areas within a production shed. Sharing of personnel between production sheds (or production units within a shed) is not recommended.

Enhanced biosecurity is also encouraged on all other premises with pigs. The *National farm biosecurity manual for pork production*¹⁵ provides guidelines for pig producers on both routine and high-risk biosecurity procedures. The **AUSVETPLAN enterprise manual** *Pig industry* provides additional details on the biosecurity and other response measures that may be used on pig premises in an EAD response.

4.3.6 Biosecurity for equipment

Stringent biosecurity measures to manage the movements of equipment, vehicles and other things on and off premises will be important for controlling ASF.

Movements of vehicles and equipment onto or off high-risk premises (IPs, DCPs, DCPFs, SPs and TPs) should be limited, where possible. Where possible, loading facilities and feed bins should be located near perimeter fencing (with shuttles to the main feed storage, etc), to limit vehicular movements onto premises.

Equipment to be used in handling pigs and/or potentially contaminated items or areas (eg in sampling of pigs, or their products and byproducts, or in destruction, disposal and decontamination activities) on high-risk premises (IPs, DCPs, DCPFs, SPs and TPs) should be considered contaminated and either disposed of on site (see Section 4.3.12) or decontaminated (see Section 4.3.13). Equipment should not be shared between pig sheds – and ideally not between production units within a shed.

Nonreusable equipment should be disposed of in a biosecure manner (eg incineration, commercial hazardous biological waste program). Reusable equipment (including vehicles) should be decontaminated (see the **AUSVETPLAN** *Decontamination manual*) on exit from the premises (or at an approved 'receiving' premises) and allowed to completely dry before reuse.

Enhanced biosecurity is encouraged on all other premises with pigs. The *National farm biosecurity manual for pork production*¹⁶ provides guidelines for pig producers on both routine and high-risk biosecurity procedures. The **AUSVETPLAN enterprise manual** *Pig industry* provides additional details on the biosecurity and other response measures that may be used on pig premises in an EAD response.

4.3.7 Animal welfare

Guidance on managing livestock welfare can be found in the **AUSVETPLAN operational manual** *Livestock welfare and management*.

Because morbidity and mortality resulting from ASF may be high, close monitoring and careful management of animal welfare on affected premises will be required.

The imposition of movement controls for live pigs on premises with intensive livestock production (such as piggeries) may result in the development of animal welfare issues, particularly as a result of overcrowding. This can occur within days to weeks, depending on the production system in use (Garner et al 2012).

¹⁵ www.farmbiosecurity.com.au/toolkit/plans-manuals

¹⁶ www.farmbiosecurity.com.au/toolkit/plans-manuals

If a processing facility is affected or is in a declared zone, overcrowding on unaffected farms may result in similar animal welfare issues. Thus, problems with overcrowding may extend to the greater industry, and this will need consideration during a response.

Careful management will be required to avoid or mitigate the welfare issues – for example:

- stopping mating or artificial insemination (where possible)
- using maintenance feed rations to slow growth rates (where possible)
- providing access to temporary housing on-site
- ensuring rapid destocking (where a stamping-out policy is being implemented)
- ensuring that biosecure transport to an approved abattoir is readily available (where a modified stamping-out policy is being implemented).

Culling of overcrowded pigs on-farm will likely need to be considered.

4.3.8 Vaccination

There is currently no commercially available vaccine against ASF.

4.3.9 Treatment of infected animals

The treatment of infected animals is not effective and will not be undertaken.

[4.3.10 Treatment of animal products and byproducts

Products and byproducts from pigs on IPs and DCPs should not be treated but should be disposed of (see Section 4.3.12). For DCPFs, it might be possible to allow product differentiation based on a risk assessment if there has been adequate separation between contaminated and uncontaminated products.

Products and byproducts from pigs on SPs and TPs should be risk assessed to determine whether they need to be placed in quarantine until the status of the premises of origin is clarified.

Section 2.4.2 outlines the minimum level of treatment that would be expected to inactivate ASF virus in pig products and byproducts.]

[4.3.11 Destruction of animals

Guidance on destruction methods can be found in the **AUSVETPLAN operational manual** *Destruction of animals*.

Destruction plans should be developed for each premises on which animals may be destroyed.

Stamping out

On IPs, all pigs will be destroyed.

On DCPs, based on a risk assessment (Olesen et al 2018a, Eblé et al 2019), high-risk pigs should be destroyed. These could include:

- pigs originating from an IP (within the trace-back window)
- pigs that have had direct contact with pigs on an IP

- pigs that have had access to the faeces, urine and/or secretions of pigs moved from an IP
- pigs exposed to contaminated feed or water
- pigs on which artificial insemination equipment, surgical equipment or hypodermic needles that have previously been used on an IP have been used (unless the equipment or needles were subject to an approved decontamination process before leaving the IP)
- pigs that have been handled by personnel immediately after they have handled pigs from an IP.

The management of other pigs on DCPs should be based on the findings of the risk assessment, taking into consideration the likelihood of exposure to ASF virus and the potential risks of disease transmission (within the premises and to other premises), including the consequences for disease control.

On a case-by-case basis, process slaughter may be considered for low-risk pigs on DCPs where capacity is available at an APF and the risks of disease transmission from transportation can be adequately addressed.

On SPs and TPs, the priority will be to clarify the status of the premises as quickly as possible. Stamping out on these premises is not expected but may be considered on a case-by-case basis, taking into consideration the likelihood that infection may be present, the consequences for disease control and the availability of resources.

Welfare slaughter

Humane destruction on-site may be considered on any premises where pigs are experiencing welfare issues, such as overcrowding due to the imposition of movement restrictions, and transport to appropriate processing facilities presents an unacceptable risk of disease transmission. Animals destroyed on-site require biosecure disposal.]

[4.3.12 Disposal of animals, and animal products and byproducts

Guidance on disposal options and methods can be found in the **AUSVETPLAN operational** manual *Disposal*.

Disposal plans should be developed for each IP, DCP and DCPF. Disposal of potentially high-risk materials from SPs and TPs may also be required before the investigation of their status is complete.

High-risk materials from quarantined premises should be disposed of in a biosecure manner onsite or at an approved disposal site (ADS).

High-risk materials include carcasses, culled animals, animal products and byproducts, wastes, effluent and contaminated fomites (eg clothing, equipment) that cannot be adequately decontaminated. Feed may be a high-risk material if, based on epidemiological assessment, it is implicated in the spread of disease or is otherwise potentially contaminated with ASF virus.

The method chosen for disposal will be influenced by the type and volume of material to be disposed of, the resources available, the local environment, the prevailing weather, legislative requirements (including environmental protection legislation) and the risk of spreading the disease.
Risk material should be disposed of in a way that prevents feral pigs and mechanical vectors (such as rodents and biting insects) from gaining access to contaminated material. Deep burial, composting or above-ground burial may be considered.

Decontamination of all equipment and machinery involved in disposal will be required. Disposal must be auditable in terms of biosecurity, traceability and financial requirements.

Where disposal on-site is not feasible, an approved site for disposing of risk material may be used, subject to risk assessment and taking into consideration the risk of transmission of ASF virus during transport of the risk material to the disposal site. Movements of risk material should be in accordance with the recommended movement controls in **Section 6**.]

[4.3.13 Decontamination

Decontamination requires:

- pre-treatments to reduce the level of organic matter (eg combinations of soaking, scrubbing, detergents, high-pressure water, physical removal)
- adequate contact time and concentration of the active ingredients
- temperature and pH within the effective range for the agent being used.

Guidance on decontamination can be found in the **AUSVETPLAN operational manual** *Decontamination*.

Decontamination of contaminated premises (IPs, DCPs and DCPFs) and fomites (eg clothing, footwear, nondisposal equipment) is a critical part of the response to ASF. Decontamination plans should be developed for each premises to be decontaminated.

IPs should be decontaminated following depopulation and disposal of infected material.

Staged decontamination may be required on DCPs where complete depopulation of the premises is not undertaken (see Section 4.3.11).

ASF virus is susceptible to a range of disinfectants (refer to the Australian Pesticides and Veterinary Medicines Authority permit 88135 and the *Decontamination* manual).]

[4.3.14 Wild animal management

Guidance on the management of wild animals in an EAD response is provided in the **AUSVETPLAN operational manual** *Wild animal response strategy*.

ASF virus may be spread by feral pigs, other pest animals (eg rodents) and biting insects (eg flies, mosquitoes).

Feral pigs

Surveillance of feral pig populations near IPs will be required. If feral pigs are infected, measures to manage the disease in these populations may need to be considered. A control program should be developed in consultation with experts on the ecology and control of feral pigs.

European experience of a staged approach to wild boar control should be taken into consideration (see Section 2.9).¹⁷

Where eliminating infection from the feral pig population is not feasible, compartmentalisation of the commercial pig industry may need to be pursued (see Section 4.4).

In some situations, pre-emptive culling could be considered to provide a buffer zone between discrete feral pig populations.

Rodents and biting insects

Rodent and insect control measures should be implemented to minimise the risk of contamination of these animals with ASF virus, and minimise the risk of transmission to neighbouring feral and domestic pig populations.]

4.3.15 Vector management

Early epidemiological investigation into potential tick vector species will be important to inform vector management because it is currently unknown whether tick species in Australia will play a role in disease spread. With input from an entomologist, a vector monitoring program should be implemented to identify whether ticks are implicated in the epidemiology of ASF in Australia and, if so, the species involved.

If tick species are implicated in the spread of ASF in Australia, a targeted approach to vector control to break the transmission cycle should be developed, with entomological advice.

Control of the stable fly (*Stomoxys calcitrans*), which has been identified as a mechanical vector of ASF (Mellor et al 1987), will be difficult to achieve.

4.3.16 Public awareness and media

Guidance on managing public information can be found in the *Biosecurity incident public information manual*.

Public awareness and industry engagement will support a cohesive response. The communications strategy should include mechanisms for raising awareness in pig hunters, owners of petting zoos and school farms, urban and peri-urban pig owners, and managers of smaller commercial piggeries (who may not be engaged with the industry peak body, for example). Consumers of pork products should be targeted by food safety messaging.

Key topics to be covered in public information messaging will include advice on:

- the safety of food and other products derived from pigs
- signs of ASF in pigs and how to report suspect cases
- modes of transmission of ASF virus, including spread by people
- measures to prevent the entry of ASF to pig production premises
- where to find more information on the response and the control measures being used.

¹⁷ The Czech experience is reported on the OIE website (<u>https://web.oie.int/RR-Europe/eng/Regprog/docs/SGE%20ASF12/17_CZ_detailed_situation.pdf</u>).

National coordination of public information and engagement messaging, both in the event of an ASF incident and in preparation for a potential outbreak in Australia, may occur through activation of the National Biosecurity Emergency Communication Network.¹⁸ The network will coordinate animal health information, and liaise with Australian Pork, and public health and environmental agencies.

4.3.17 Other strategies

Swill feeding of pigs carries a high risk of introducing ASF to a herd. Both in the event of an ASF incident and during preparation for a potential incursion of ASF into Australia, a multi-agency approach will be needed to enforce current swill-feeding bans. Security at municipal garbage tips should be improved to prevent feral pigs gaining access to domestic food scraps. A widespread, multilingual public awareness campaign should support these controls.

4.3.18 Stand-down

Stand-down of the response will occur when the National Management Group formally declares that the outbreak is over. This may be when it decides (on advice from the CCEAD) that ASF has been eradicated, or that eradication is no longer considered feasible.

Additional information on the stand-down of EAD responses can be found in the **AUSVETPLAN** management manual: *Control centres management, Part 1*.

4.4 Other control and eradication options

If it is not feasible to eradicate ASF using the strategies outlined above, a long-term control program may need to be developed through consultation between Australian governments and the pig industry. Should ASF virus become established in the feral pig population, the control program may include compartmentalisation of the commercial pig industry, supported by accredited industry quality assurance and/or government accreditation programs.

4.5 Funding and compensation

General considerations

Details of the cost-sharing arrangements can be found in the EAD REsponse Agreement.¹⁹ Details of the approach to the valuation of, and compensation for, livestock and property in disease responses can be found in the **AUSVETPLAN operational manual Valuation and compensation**.

¹⁸ Previously known as the Primary Industries National Communication Network (NCN). More information is available at <u>www.outbreak.gov.au/about/biosecurity-incident-national-communication-network</u>.

¹⁹ www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/ead-response-agreement

5 Declared areas and premises

[5.1 Declared areas

Detailed guidelines for declared areas are provided in the AUSVETPLAN guidance document *Declared areas and allocation of premises classifications in an EAD response*.

5.1.1 Restricted area (RA)

For African swine fever (ASF), an RA will be declared to encompass all infected premises (IPs) and dangerous contact premises (DCPs), and include as many suspect premises (SPs), trace premises (TPs) and dangerous contact processing facilities (DCPFs) as practicable. As a general recommendation, the borders of the RA should be at least 3 km from the nearest IP, DCP, DCPF, SP or TP and should be based on risk assessment. This risk assessment should consider:

- the known distribution of infection
- the length of time infection is thought to have been present in the area, and therefore where subclinical infection may be present
- the location and distribution of populations of susceptible animals (including feral pigs) in the area, and patterns of livestock movements
- the location of key elements in industry supply chains (eg abattoirs, artificial breeding centres)
- any likely local tick vector species, and their distribution and expected dispersal
- the location, distribution and dispersal in the area of populations of nonsusceptible animals (eg rodents) and insects, which may act as mechanical vectors
- the expected rate of spread of ASF due to local dispersal associated with susceptible and nonsusceptible animals (see Section 2.4.3)
- human activities in the area (eg tourism, hunting) that may contribute to the mechanical dispersal of infection
- impacts on the industry of the disease control measures compared with the expected benefits of disease control
- prevailing weather conditions (and so the expected persistence of ASF virus)
- local land use (eg presence of national parks)
- known characteristics of ASF virus
- confidence in the accuracy of available information.

5.1.2 Control area (CA)

For ASF, the CA may initially encompass the whole of the affected state(s) or territory(ies).

Where this is not the case, as a general recommendation, the borders of the CA should be at least 10 km from the borders of RA(s) within it and should be based on risk assessment, taking into consideration the factors outlined above.]

5.2 Other areas

Not relevant.

[5.3 Declared premises

Detailed guidelines for declaring premises status are provided in the **AUSVETPLAN guidance** document *Declared areas and application of premises classifications in an EAD response*.

5.3.1 Premises status classifications

For ASF, the premises classifications to be used are:

- infected premises (IP)
- suspect premises (SP)
- trace premises (TP)
- dangerous contact premises (DCP)
- dangerous contact processing facility (DCPF)
- approved processing facility (APF)
- approved disposal site (ADS)
- at-risk premises (ARP)
- premises of relevance (POR)
- resolved premises (RP)
- unknown status premises (UP)
- zero susceptible species premises (ZP).

5.3.2 Qualifiers

An 'assessed negative (AN)' qualifying category may be added to a property status.

5.3.3 Other disease-specific classifications

Not relevant.]

[5.4 Reclassifying premises and previously declared areas

Detailed guidelines for reclassifying previously declared areas are provided in the AUSVETPLAN guidance document *Declared areas and application of premises classifications in an EAD response*.

Reclassifying premises

Guidelines for assessing SPs and TPs as negative and reclassifying their status are outlined in Section 7.1.2.

IPs and DCPs require action to address the risk that infection and/or contamination with ASF virus is present. To assess an IP or DCP that houses pigs as negative – and allow its reclassification, release from quarantine and restocking – a minimum of 6 weeks should have passed since completion of control measures on the premises, including decontamination and placement of sentinel animals. The actual time before placement of sentinel animals should consider a range of factors, including:

- ambient temperature
- confidence in the decontamination process (eg types of surfaces and substrates that were decontaminated).

Guidance on the use of sentinel animals before release from quarantine and restocking is provided in Section 7.1.2.

DCPs and DCPFs that do not house or process pigs can be reclassified 24–48 hours after decontamination or based on risk assessment, to allow sufficient drying time.

Reclassifying previously declared areas

For ASF, the key principles for reclassifying a previously declared area to one of a lower risk status include the following:

- The area is epidemiologically distinct from other declared areas.
- All TPs and SPs have been investigated and reclassified, and all IPs, DCPs and DCPFs in the area have been reclassified as RPs (or APFs).
- All tracing and surveillance associated with disease control has been completed satisfactorily, with no evidence or suspicion of infection in the area.
- A minimum period of two incubation periods (30 days) has elapsed since predetermined disease control activities (including depopulation and decontamination) and risk assessment were completed on the last IP or DCP²⁰ in the area.
- An approved surveillance program (including the use of sentinel animals, if appropriate) has confirmed no evidence of infection in domestic and feral pig populations in the RA.]

²⁰ Not relevant for DCPFs

6 Movement controls

6.1 General principles

The principles for the recommended quarantine practices and movement controls are as follows:

- Containment and eradication of African swine fever (ASF) is the highest priority.
- Live animals pose the greatest risk of disease spread; therefore, their movements from all premises within the restricted area (RA) and control area (CA) must be strictly controlled.
- The outside area (OA) should remain as 'clean' as possible. Therefore, movement of animals from the RA to the OA is prohibited, and movement of products is generally prohibited. Movement of animals and products from the CA to the OA will also be restricted.
- The numbers of susceptible animals within the RA should be minimised. Therefore, movements of animals into the RA will be limited and usually for slaughter only.
- Movement restrictions are more stringent within the RA than within the CA, and will be more stringent in the early stages of the response.
- Movement controls may be varied during a response from those listed here. However, this
 will involve a variation to the agreed Emergency Animal Disease Response Plan, with
 endorsement by the Consultative Committee on Emergency Animal Diseases and the
 National Management Group.
- Recommended movement controls apply to movements, whether on foot or by vehicle, that involve either public or private land.

6.2 Guidelines for issuing permits

When assessing risk for the purposes of issuing a permit, the elements to consider may include:

- sources of risk
 - pigs
 - numbers of animals moved, or amount of product moved
 - type of product
 - presence of ASF virus on both the originating and destination premises, and uncertainty
 - location of source and destination premises
 - fate at destination premises (eg for slaughter vs for growing out)
 - current vector activity, if relevant, including feral pigs
 - organisation and management issues (ie confidence in animal tracing and surveillance)
 - proposed use of the animals or products
 - proposed transport route
 - treatment of animals and vehicles to prevent concurrent movement of vectors, if relevant
 - security of transport
 - security and monitoring at the destination
 - environment and natural events
 - community and human behaviour
 - risk of sabotage
 - technology
 - regulations and standards
 - available resources for compliance and enforcement

- areas of impact
 - livestock health (health of affected species, including animal welfare)
 - human health (including work health and safety)
 - trade and economic impacts (including commercial and legal impacts)
 - environmental impacts
 - organisational capacity
 - political impacts
 - reputation and image
- proposed risk treatment measures
 - destruction of animals
 - processing of product
 - disinfection or other treatment of animals, vehicles and fomites
 - vector control, if relevant
 - biosecurity
 - security
 - communication.

[6.3 Types of permits

Permits are either general or special. They are legal documents that describe the animal(s), commodities or things to be moved, the origin and destination, and the conditions to be met for the movement. Either type of permit may include conditions. Once permit conditions have been agreed from an operational perspective, all permit conditions must be met for every permit. Both general and special permits may be in addition to documents required for routine movements between or within jurisdictions (eg health certificates, waybills, consignment notes, National Vendor Declarations – NVDs).

6.3.1 General permit

General permits (GPs) are used for lower-risk movements, and create a record of each movement to which they apply. They are granted without the need for direct interaction between the person moving the animal(s), commodity or thing and a government veterinarian or gazetted inspector of stock. The permit may be completed via a webpage or in an approved place (such as a government office or commercial premises). A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. GPs may not be available until the relevant chief veterinary officer (CVO) gives approval for general movements, and this may not be available in the early stages of a response.

6.3.2 Special permit

Special permits (SpPs) are issued by the relevant government veterinarian or gazetted inspector of stock. They are used for higher-risk movements, and therefore require formal application and individual risk assessment. SpPs describe the requirements for movement of an animal (or group of animals), commodity or thing, for which a specific assessment has been conducted by the relevant government veterinarian or gazetted inspector of stock. A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements.

Emergency permit

An emergency permit is an SpP that specifies strict legal requirements for an otherwise high-risk movement of an animal, to enable emergency veterinary treatment to be delivered, to enable animals to be moved for animal welfare reasons, or to enable any other emergency movement under exceptional circumstances. These permits are issued on a case-by-case basis under the authorisation of the relevant CVO.]

[6.4 Recommended quarantine practices and movement controls

Movement controls and quarantine will be imposed as quickly as possible on all premises and areas on which ASF infection is either known or suspected. Movement controls will apply to anything that may have become contaminated with ASF virus.

Infected premises (IPs), dangerous contact premises (DCPs) and suspect premises (SPs) will be declared.

Movement controls both onto and off the premises will apply to all animals, people, products and fomites. Since ASF virus is not transmitted from farm to farm by wind, preventing the movement of suspect animals, people and materials will contain the disease. It may be several weeks before there can be any confidence that no pigs on other properties in an area are incubating the disease, and quarantine measures will be maintained during this time.

Product from IPs will be destroyed and disposed of in a safe manner, preferably by burial on the IP.

An RA and CA will be declared around the IP. Declaration of these areas helps to prevent disease spread, by restricting movement onto and off the premises that are most likely to have had direct or indirect contact with the IP.

An RA may also be declared around an infected feral pig population so that suitable controls can be implemented.

6.4.1 Live susceptible animals

Table 6.1 describes the recommended movement controls for live pigs within and between declared areas.

To→ From ↓		RA		CA		OA
		IP/DCP/ SP/TP	ARP/DCPF/ APF	SP/TP	POR	
RA	IP/DCP/ SP/TP	Prohibited		Prohibited		Prohibited
	ARP	Prohibited	Prohibited, except under SpP1	Prohibited		
CA	SP/TP	Prohibited		Prohibited		Prohibited
	POR	Prohibited	Prohibited, except under SpP2	Prohibited	Prohibited, except under GP1	
OA		Prohibited	Prohibited, except under SpP2	Prohibited	Prohibited, except under GP1	Allowed under normal jurisdictional requirements

 Table 6.1
 Recommended movement controls for live pigs

APF = approved processing facility; ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; DCPF = dangerous contact processing facility; GP = general permit; IP = infected premises, OA = outside area; POR = premises of relevance; RA = restricted area; SP = suspect premises; SpP = special permit; TP = trace premises

Notes for Table 6.1

SpP1 conditions:

- With CVO approval, emergency permit for exceptional circumstances only (primarily for welfare reasons) after a risk assessment indicates that the risk associated with movement is acceptable within the response.
- For slaughter, or to an at-risk premises (ARP) for other purposes.
- Travel by approved routes only and no stopping en route.
- Appropriate biosecurity standard at receiving premises.
- Appropriate decontamination of equipment and vehicles.
- Absence of clinical signs in all animals on the property before and on the day of travel.
- Single consignment per load.
- Any suspect clinical signs are immediately reported to the local control centre (LCC) or state coordination centre (SCC).
- Physical identification of individual animals (eg ear tag, brand) with accompanying movement documentation (eg NVD, waybill, PigPass).

SpP2 conditions:

- For slaughter only, if the RA contains the only available abattoir.
- Travel by approved routes only and no stopping en route.
- Appropriate biosecurity standard at receiving premises.
- Appropriate decontamination of equipment and vehicles.
- Absence of clinical signs in all animals on the property before and on the day of travel.

- Single consignment per load.
- Any suspect clinical signs are immediately reported to the LCC or SCC.
- Physical identification of individual animals (eg ear tag, brand) with accompanying movement documentation (eg NVD, waybill, PigPass).

GP1 conditions:

- For slaughter, movement within an approved compartment or movement to other premises of relevance (PORs).
- Travel by approved routes only and no stopping en route.
- Appropriate decontamination of equipment and vehicles.
- Absence of clinical signs in all animals on the property before and on the day of travel.
- Physical identification of individual animals (eg ear tag, brand) with accompanying movement documentation (eg NVD, waybill, PigPass).

6.4.2 Semen and embryos from live susceptible animals

Pig semen

Since ASF virus can be transmitted by semen, movement of semen from high-risk premises and out of the RA will be prohibited. To enable business continuity, semen sourced from properties in the CA and OA can be moved into the RA and CA under permit. However, since pigs on IPs and DCPs will be slaughtered, movement of semen onto IPs or DCPs (as well as onto SPs and trace premises – TPs) is prohibited.

Table 6.2 describes the recommended movement controls for pig semen within and between declared areas.

Table 6.2	Recommended	movement	controls	for pig	semen
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To→ From ↓		RA		CA		OA
		IP/DCP/ SP/TP	ARP	SP/TP	POR	
RA	IP/DCP/ SP/TP	Prohibited		Prohibited		Prohibited
	ARP					
CA	SP/TP	Prohibited		Prohibited		Prohibited
	POR	Prohibited	Prohibited, except under SpP3	Prohibited	Prohibited, except under SpP3	
OA		Prohibited	Prohibited, except under GP2	Prohibited	Prohibited, except under GP2	Allowed under normal jurisdictional requirements

ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; GP = general permit; IP = infected premises, OA = outside area; POR = premises of relevance; RA = restricted area; SP = suspect premises; SpP = special permit; TP = trace premises

Notes for Table 6.2

SpP3 conditions:

- Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures, accurate record keeping, and semen containers being adequately cleaned and biosecure.
- Absence of clinical signs in all animals on the property before and on the day of collection and since that time.

GP2 conditions:

- Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures, accurate record keeping, and semen containers being adequately cleaned and biosecure.
- Absence of clinical signs in all animals on the property before and on the day of collection and since that time.
- Accurate record keeping of all semen movements off the property.

Pig embryos

The International Embryo Transfer Society (IETS) has indicated that there is not enough information to reach a conclusion regarding the risk of transmission of ASF virus via embryos.

Movements of pig embryos within the OA are allowed. Movements of pig embryos within the RA are prohibited. Movements of pig embryos within the CA must be under a GP (GP3) with the following conditions.

GP3 conditions:

• Embryos collected and handled in accordance with procedures detailed in the current edition of the IETS manual.

- Absence of clinical signs in all animals on the property before and on the day of collection and since that time.
- Accurate record keeping of all embryo movements off the property.
- Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures.

6.4.3 Meat and meat products

The risks from pigmeat and offal are addressed primarily through the movement controls on live pigs going to slaughter and the fact that swill feeding is illegal in all jurisdictions. Because ASF is not a zoonosis, disease concerns are mainly limited to ASF in pigs arising from the diversion of pigmeat or offal for pig feed. As well, many other products from pigs, such as heart valves, uteruses and ears, are sold from pig abattoirs. The movement of these miscellaneous products should be considered on a case-by-case basis following a risk assessment that takes into consideration the destination, product type and end use.

Table 6.3 describes the recommended movement controls for fresh or frozen pigmeat and offal within and between declared areas.

То→	RA	СА	OA
From ↓			
RA	Prohibited, except under SpP4	Prohibited, except under SpP4	Prohibited
СА	Prohibited, except under GP4	Prohibited, except under GP4	Prohibited
OA	Allowed under normal jurisdictional requirements	Allowed under normal jurisdictional requirements	Allowed under normal jurisdictional requirements

Table 6.2 Recommended movement controls for fresh/frozen pigmeat and offal

CA = control area; GP = general permit; OA = outside area; RA = restricted area; SpP = special permit

Notes for Table 6.3

SpP4 conditions:

- For disposal.
- Biosecure transport to an approved disposal or rendering facility, or biosecure disposal onsite and transport by approved routes only.
- The material is not brought into direct or indirect contact with susceptible animals.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicles and containers are decontaminated under supervision between loads.

GP4 conditions:

- The material is not brought into direct or indirect contact with susceptible animals.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicles and containers are decontaminated under supervision between loads

6.4.4 Waste products and effluent

Pig effluent can transmit ASF virus, and the virus persists in the environment; therefore, movement of piggery wastes from high-risk premises and out of the RA is generally prohibited. However, movement of piggery wastes from IPs may be allowed under SpP and after depopulation, to properties in the RA without susceptible livestock (zero susceptible species premises – ZPs).

Table 6.4 describes the recommended movement controls for waste products and effluent, including offal not for human consumption, within and between areas.

To→		RA		CA		OA
From ↓		IP/DCP/ SP/TP	ZP/disposal facility	SP/TP/ POR	ZP/disposal facility	
RA	IP/DCP	Prohibited	Prohibited, except under SpP5	Prohibited	Prohibited	Prohibited
	SP/TP		Prohibited		Prohibited	
	ARP		Prohibited		Prohibited	
CA	SP/TP	Prohibited		Prohibited	Prohibited	Prohibited
	POR				Prohibited, except under GP5	
OA Prohibited		Allowed und jurisdictiona	er normal I requirements	Allowed under normal jurisdictional requirements		

Table 6.3 Recommended movement controls for waste products and effluent, including offal not for human consumption

ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; GP = general permit; IP = infected premises; OA = outside area; POR = premises of relevance; RA = restricted area; SP = suspect premises; SpP = special permit; TP = trace premises; ZP = zero susceptible species premises

Notes for Table 6.4

SpP5 conditions:

- From IPs, after a minimum of 30 days following depopulation.
- Must be treated to inactivate virus before movement.
- The material is not brought into direct or indirect contact with susceptible livestock.
- Travel by approved routes only.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicles and containers are decontaminated under supervision between loads.

GP5 conditions:

• The material is not brought into direct or indirect contact with susceptible livestock.

- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicles and containers are decontaminated under supervision between loads.

6.4.5 Empty livestock transport vehicles and associated equipment

Because the survival time for ASF virus in organic matter can be prolonged, vehicles that have been used to transport live pigs, and equipment used with live pigs or their products must be thoroughly cleaned after use.

For movement within RAs of vehicles and equipment that have had direct contact with pigs or their products, and movement of these vehicles and equipment from RAs to CAs or the OA, an SpP (SpP6) with the following conditions should be obtained.

SpP6 conditions:

- Vehicles and equipment are appropriately decontaminated before and after use at an appropriate site (eg truck wash-down facility at an abattoir). It should be ensured that vehicles and equipment have adequate contact time with the relevant disinfectant before use, and runoff from the decontamination sites needs to be managed (refer to the AUSVETPLAN operational manual *Decontamination* for disinfectant information, adequate contact times and management of runoff).
- On leaving higher-risk premises or the RA, all vehicles are subject to inspection and/or appropriate decontamination.

For movements within CAs of vehicles or equipment that have had direct contact with pigs or their products, and movements of these vehicles and equipment from the CA to the OA, a GP (GP6) with the following conditions should be obtained.

GP6 conditions:

- Vehicles and equipment are appropriately decontaminated before and after use at an appropriate site (eg truck wash-down facility at an abattoir). It should be ensured that vehicles and equipment have adequate contact time with the relevant disinfectant before use, and runoff from the decontamination sites needs to be managed. Decontamination sites for vehicles should have sufficient equipment, water supply, drainage and materials to decontaminate the expected number of vehicles. Further information on decontamination procedures and site preparation is available in the AUSVETPLAN operational manual Decontamination and nationally agreed standard operating procedure (NASOP) 12:
 - Decontamination of large equipment.²¹

6.4.6 People and nonsusceptible animals

Movements of people and nonsusceptible animals off IPs, DCPs, SPs and TPs will be restricted and subject to appropriate decontamination procedures to prevent mechanical spread of ASF virus. Within the RA, people who regularly travel from farm to farm and come into contact with pigs will be required to undergo appropriate decontamination of themselves, and their overgear,

²¹ www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/nationally-agreed-standardoperating-procedures

equipment and vehicles between properties, and keep detailed records of their movements. Unnecessary movements of people and nonsusceptible animals onto and off premises in the RA should be discouraged.

Further information is available in NASOP 01: *Personal decontamination – entry and exit procedures* and NASOP 26: *Decontamination of groups of people – entry and exit procedures*.²²

6.4.7 Crops, grains, hay, silage and mixed feeds

Crops, grains, hay and silage harvested from paddocks that were sprayed or treated with effluent on an IP or DCP within the 60 days before the first signs of ASF, or mixed feeds made from such constituents, are not permitted to be moved off-site. Other crops and grains may be moved from IPs and DCPs after decontamination of the material, and moved to premises in the RA or CA, provided that the vehicle movement requirements are observed. Crops and grains may be moved, without decontamination, from lower-risk premises within the RA or CA to other premises in the RA or CA, provided that the vehicle movement requirements are observed.

Movement of feed onto IPs and DCPs may be necessary for animal welfare reasons; these movements would be permitted from low-risk premises or premises in the OA, provided that the vehicle movement requirements are observed.]

²² www.animalhealthaustralia.com.au/what-we-do/emergency-animal-disease/nationally-agreed-standardoperating-procedures

7 Surveillance and proof of freedom

7.1 Surveillance

The key objectives and priorities for surveillance in response to an outbreak of African swine fever (ASF) are outlined in Section 4.3.3.

7.1.1 Specific considerations

Specific considerations for surveillance for ASF include the following:

- The presentation of ASF may vary considerably with the virulence of the virus strain.
- ASF may present similarly to many endemic diseases, and laboratory investigation is required for diagnosis.
- Captive pig populations include those that are part of commercial, smallholding and backyard production; domestic pets; and pigs held in educational farms, petting zoos, zoos and so on.
- Surveillance of feral pig populations will be important because they may act as reservoirs of infection, and to provide evidence to support proof of freedom.
- Surveillance of potential tick vector species and other vectors (eg biting insects), as appropriate, will be required.

The types of surveillance that are most appropriate for ASF are:

- active surveillance of premises identified through tracing to determine whether they contain
 infected animals and/or contaminated items this may include field surveillance (ie property
 visits), telephone surveillance and regular review of herd records
- enhanced passive surveillance to detect premises and feral pig populations containing infected animals showing clinical signs that were not identified through tracing – this will involve encouraging producers, animal health professionals, other members in the pig supply chain, pig hunters, zoos and so on to report pigs showing signs consistent with ASF
- active surveillance at congregation points (eg saleyards, abattoirs) to identify pigs showing clinical signs that have not been identified through tracing.

Active surveillance of healthy pigs and other pigs with no known links to the outbreak (eg at slaughter, during field visits to premises with pigs) is unlikely to be an efficient way of detecting cases of ASF. However, it could be considered in some situations – for example, if producer-led reporting is not adequate for the population at risk (eg feral pigs), for a widespread outbreak or for proof of freedom.

Other activities to complement the above surveillance techniques include retrospective examination of abattoir records for high condemnation rates for fever, and retrospective examination of samples submitted to laboratories from instances of disease that could have been ASF.

Using ropes to collect oral fluids has been demonstrated to be effective for ASF (Grau et al 2015), and may have a place for in-herd surveillance. It is not a recommended approach to investigating suspect cases.

7.1.2 Premises surveillance

Domestic animals

Surveillance activities (eg field visits, telephone surveillance) should be prioritised based on risk, as indicated by the premises classification. Where the number of these premises is large (with limited available resources), further prioritisation may be required. This should take into consideration the likelihood that infection may be present, and the risk of further disease transmission and dissemination in both domestic and feral pig populations.

Surveillance on infected premises (IPs)

Surveillance on IPs may be useful to:

- confirm that infection is present, if the premises was classified as an IP without laboratory confirmation
- confirm the infection status of any rare and valuable animals (particularly if alternative disease control measures are being considered)
- aid epidemiological understanding of the outbreak, including on large premises for example
 - clinical monitoring if the presentation of ASF is atypical
 - genetic mapping or other characterisation of the virus present for example, if the IP is not linked to other areas of infection, or periodically throughout the outbreak to monitor for changes in virus virulence or characterisation.

Where laboratory investigation is required, the selection of animals to sample should be risk based, considering the presence of distinct epidemiological units or groups of animals on the premises. It should include sufficient animals to be representative of each distinct population present. Animals to target for sampling include:

- dead animals
- animals showing clinical signs consistent with ASF
- animals most likely to be severely affected (considering species, age, etc)
- animals introduced to the premises in the tracing window of interest (as these may be a source of infection)
- animals more likely to be infected (eg those with a history of recent exposure to other animals, such as breeding males with higher numbers of matings recently; those returned from aggregation points, such as saleyards)
- rare and valuable animals.

Surveillance on suspect premises (SPs)

Veterinary investigation of SPs is a priority, and should occur as soon as practical after suspicious signs are recognised and reported.

Given the range of clinical presentations of ASF, it is possible that a large number of SPs will require investigation. As a general guide, SPs with epidemiological links to IPs should be investigated as the highest priority; those with no epidemiological links to IPs should be considered a lower priority. (There are many endemic causes of clinical signs similar to ASF, and therefore many reports will not be due to ASF. However, to ensure that producers are not discouraged from reporting, it is important that authorised government officers or personnel directed by the jurisdictional authority conduct surveillance to resolve these cases in a timely manner, as far as possible.)

SPs in the outside area (OA) are a higher priority for investigation than those in the control area (CA) or restricted area (RA).

SPs in the CA are a higher priority for investigation than those in the RA.

SPs with rare and valuable animals area higher priority for investigation than those of equivalent risk status but without such animals.

On SPs, the approach should be as follows:

- An epidemiologically representative sample of pigs on the premises should be examined for clinical signs that could be consistent with ASF.
- Samples should be taken from all pigs found to be showing (even vague) clinical signs or from recent mortalities. Samples should be sufficient to enable testing for differential diagnoses.
- Healthy pigs should be sampled for serological testing. Detection of seroconversion will help indicate how long ASF virus may have been present on the premises and provide data for epidemiological investigations.
- If not already undertaken, an investigation should be conducted to determine whether the premises may be epidemiologically linked to the outbreak.
- If the case definition is ruled out, the premises would be given the qualifier assessed negative (AN). If it is located in the RA, it would then be reclassified as an at-risk premises (ARP) with the qualifier AN (ARP-AN). If it is located in the CA, it would be classified as a premises of relevance (POR) with the qualifier AN (POR-AN).

The timing of laboratory testing and the period of observation/quarantine may be affected by:

- the virulence of the circulating virus strain for example, a shorter period between laboratory testing rounds or a shorter period of observation may be sufficient if highly virulent virus is circulating with more acute presentation and dramatic clinical signs
- proximity to other cases in the area for example, if there are other cases nearby, a more extended period of observation may be preferable
- the strength of epidemiological links to other cases
- potential involvement of feral pigs for example, if ongoing contact with feral pigs cannot be ruled out, a more extended period of observation may be preferable

If negative test results are reported, but there remains an epidemiological link to an IP, the property status may revert to trace premises (TP) or dangerous contact premises (DCP), and measures for this new status will need to be completed.

Surveillance on trace premises (TPs)

Surveillance activities (eg field visits, telephone surveillance) should be prioritised based on risk, as indicated by the premises classification.

Prioritisation of visits should be risk based and informed by advice on mortalities, and production records on the premises. It should take into consideration the likelihood that infection may be present, and the risk of further disease transmission and dissemination if the animals are infected.

Producer-led reporting of any clinical signs consistent with ASF or changes in production statistics may be used on lower-priority TPs while awaiting further assessment from authorised officers.

The approach to surveillance of live pigs on TPs should be consistent with the guidance for surveillance on SPs. In addition, where the premises was identified through tracing of contaminated animal products, wastes or things, consideration should be given to surveillance, including sampling for laboratory investigation, where warranted (eg using molecular techniques such as PCR testing where the presence of ASF virus contamination cannot be otherwise ascertained).

If live pigs on the premises show clinical signs consistent with ASF, the premises should be considered an SP, and the guidance on surveillance and assessment of SPs followed.

If there are no live pigs on the premises or if the case definition is ruled out, the premises would be given the qualifier AN. If it is located in the RA, it would then be reclassified as an ARP with the qualifier AN (ARP-AN). If it is located in the CA, it would be classified as a POR with the qualifier AN (POR-AN).

Surveillance on dangerous contact premises (DCPs) and dangerous contact processing facilities (DCPFs)

Surveillance activities (eg field visits, telephone surveillance) should be prioritised based on risk, as indicated by the premises classification. Surveillance of live pigs on DCPs and DCPFs should be consistent with the guidance for surveillance on SPs.

As for TPs, where the premises has been allocated this status because of the potential presence of contaminated animal products, wastes or things (eg the environment, feed), these items should also be subject to decontamination and surveillance, including sampling for laboratory investigation, where warranted (eg using molecular techniques such as PCR testing where the presence of ASF virus contamination cannot be otherwise ascertained).

The approach to assessing DCPs or DCPFs as negative, following completion of control activities, is outlined in Section 5.4.

Surveillance on other premises with live pigs (ARPs in the RA, PORs in the CA, and premises in the OA)

The aim of surveillance on ARPs, PORs and premises in the OA will be to detect infection (new IPs) as early as possible, while minimising opportunities for inadvertent spread of ASF virus through field visits.

Methods of surveillance may include:

- inspection of all at-risk herds or groups by owners or managers
- veterinary investigation of mortality or abortion events
- monitoring and review of production records and producer health reports
- phone interviews
- field inspection and sampling by veterinary or animal health surveillance teams.

The frequency and method(s) of surveillance chosen for individual premises will depend on the assessed risk (including from vector transmission), the number of premises to monitor (the size of the outbreak) and the available resources.

The initial approach to surveillance on ARPs, PORs and other premises with pigs in the OA would include raising awareness of the range of clinical presentations of ASF and using producer (or owner)-led reporting of clinical signs or changes in production statistics. This should be

accompanied by the provision of biosecurity advice, to help prevent the introduction and/or further spread of disease.

Surveillance activities would be risk based; for example, ARPs may be considered a higher priority for such visits, particularly ARPs in close proximity to IPs. Abattoir surveillance may also be useful for monitoring the status of pigs from these premises.

The timing and frequency of active surveillance visits in the CA and OA may differ from those in the RA. For logistical purposes (and to minimise the risk of disease spread), it may be useful to separate management and resourcing of surveillance in the CA from that in the RA.

Additional surveillance activities on these premises may subsequently be required to provide evidence to support proof of freedom.

[Surveillance of sentinels used in restocking

Use of sentinel pigs when restocking premises following depopulation and decontamination may be considered. Use of sentinels, including staged repopulation using sentinels, will only occur on the presumption that it does not create additional risk that cannot be managed (eg for a premises within 3 km of an active IP).

The decision to use sentinels should take into consideration:

- confidence in the decontamination process undertaken
- consequences for disease control if decontamination was incomplete
- the potential involvement of tick vectors; the World Organisation for Animal Health (OIE) Terrestrial Code recommends the use of sentinels for a minimum of 2 months when restocking premises if *Ornithodoros* ticks are implicated in the epidemiology of ASF in a country.

Sentinel pigs may be introduced as a staged approach to repopulation – that is, introducing sufficient numbers to all relevant areas to ensure confidence in the decontamination process. Where sentinel pigs are introduced before full restocking, the following guidance should be considered:

- Sentinel pigs should not be placed until a minimum of 6 weeks has passed since completion of decontamination on a premises. The actual time before placement should consider a range of factors, including
 - ambient temperature
 - the potential involvement of tick vectors
 - confidence in the decontamination process (e.g. types of surfaces and substrates that underwent the decontamination process). Consideration will be given to duplicating decontamination procedures after 14 days to increase the potential for virus elimination.
- Sentinel pigs should be PCR and seronegative for ASF virus before placement.
- Sentinel pigs should be monitored daily for clinical signs of disease.
- Laboratory investigation should be undertaken on
 - any pigs that show clinical signs of ASF
 - any mortalities occurring during the sentinel period (including postmortem examination and collection of appropriate tissue samples; see Section 2.5.4)
 - all sentinels every 2 weeks (serology) for a minimum of 6 weeks.

- If any sentinel pigs are confirmed as infected with ASF virus, the premises should be considered an IP and relevant control measures undertaken.
- If all sentinel pigs remain negative for the presence of ASF virus throughout the sentinel period, the premises may be assessed negative. Full restocking could then proceed, provided that restocking does not create additional risk that cannot be managed for example, use of sentinels and restocking are not likely to be permitted in declared areas of active infection (eg the RA).

Other surveillance

Surveillance of feral pig populations and any implicated vector species (soft ticks, biting insects) will also be required; see Sections 4.3.14 and 4.3.15, respectively.]

7.2 Proof of freedom

Providing confidence that ASF is no longer present in Australia will be important to satisfy trading partners and regain access to international markets, and to underpin import controls to prevent the reintroduction of ASF.

Chapter 15.1 of the OIE Terrestrial Code lists the criteria by which a country, zone, compartment or establishment may be considered free from ASF. The OIE requires a waiting period of at least 3 months following disinfection of the last infected premises, and implementation of an appropriate surveillance program in domestic and feral pigs, for a country to regain ASF freedom.

However, although the OIE provides guidelines for recovering ASF-free status, acceptance of this status following an outbreak will have to be negotiated with individual trading partners and may take considerably longer than the minimum periods prescribed in the Terrestrial Code.

A key requirement for the OIE and trading partners will be evidence of an effective surveillance program capable of detecting infection if it is present in the population, and analysis of data to support the case for disease freedom. Descriptions of the veterinary services, demographics of susceptible populations and relevant industry structures should be included to justify the design of the surveillance program.

Specific recommendations for this surveillance will be developed using the technical expertise of competent and experienced epidemiologists, and will be based on the characteristics of the outbreak. The surveillance program will need to be carefully designed and followed to ensure that it produces sufficient data that are reliable and acceptable to the OIE and international trading partners, while avoiding being excessively costly and logistically complicated. The surveillance program will include clinical, serological and molecular surveillance of relevant susceptible domestic and feral pig populations. It will include targeted and random components, and will build on the surveillance, diagnostic testing, tracing and epidemiological assessment conducted during the response phase.

In addition to the recommendations in the OIE Terrestrial Code, the design of the program will consider the general and specific considerations for ASF surveillance outlined in Section 7.1.

Appendix 1 African swine fever (ASF) fact sheet

Disease and cause

African swine fever (ASF) is a viral disease of pigs that is clinically indistinguishable from several other important pig diseases. Depending on strain virulence, infection can result in high morbidity and mortality. The disease is caused by an asfivirus. It has been responsible for serious economic and production losses overseas.

Occurrence in Australia

There have been no outbreaks of ASF in Australia.

Species affected

ASF is not a zoonotic disease.

ASF only affects domestic and feral pigs. There are no known human health risks associated with eating meat and pork products from affected animals.

Key signs

Although the literature refers to an incubation period for ASF of 4–19 days, for the purpose of this manual, the World Organisation for Animal Health (OIE) incubation period of 15 days is used.

ASF can have a number of clinical presentations, depending on the virulence of the virus strain. Pigs can be found dead with no prior clinical signs. They can have acute clinical signs including fever, depression, anorexia, hyperaemia or cyanosis of extremities (particularly the ears and snout), incoordination and laboured breathing. Mortality rates vary but can reach up to 100% depending on the strain virulence. A chronic form of the disease can occur in pigs that survive, resulting in transient fever, weight loss, pneumonia and arthritis. These pigs may become persistent shedders of the virus.

It is not possible to differentiate ASF from some other diseases of pigs (eg classical swine fever, Aujeszky's disease, erysipelas, salmonellosis) based on clinical signs alone, and laboratory testing must be conducted to diagnose the disease.

Spread

ASF virus is shed in faeces, urine, semen and haemorrhagic secretions of infected pigs. Disease transmission occurs via direct contact with infected pigs; ingestion of infected pig products; or contact with contaminated premises, equipment or people. Mechanical spread within a herd and between herds may occur via mosquitos and biting flies (*Stomoxys* spp.) feeding on viraemic pigs. It is not known if ticks from the genus *Ornithodoros* will play a role in ASF spread in Australia.

Feral pigs can become an important reservoir for the virus, and may lead to secondary spread to domestic piggeries. Control practices involve strict biosecurity management, with sanitary destruction and disposal of pig carcasses.

Persistence of the agent

ASF virus is an enveloped virus and is stable at a wide range of pH levels in serum -free medium (approximately pH 3.9–11.5); serum increases the stability of the virus. The virus remains viable when frozen but is inactivated by heat.

Glossary

Disease-specific terms

Term	Definition	
Cyanosis (adj. cyanotic)	Blueness of the skin and/or mucous membranes due to insufficient oxygenation of the blood.	
Hyperaemia	An increase in the amount of blood in a tissue or organ due to dilation of the supplying arteries.	
Petechiae	Tiny, flat red or purple spots in the skin or mucous membrane caused by bleeding from small blood vessels.	
Rendering	Processing by heat to inactivate infective agents. Rendered material may be used in various products according to particular disease circumstances.	
Transstadial transmission	When a pathogen remains with the vector from one life stage ('stadium') to the next.	
Transovarial transmission	Occurs in certain arthropod vectors as they transmit pathogens from parent arthropod to offspring arthropod.	
Standard AUSVETPLAN terms		

Standard AUSVETPLAN terms

Term	Definition
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, hoofs, bones, fertiliser).
Animal Health Committee	A committee whose members are the chief veterinary officers of the Commonwealth, states and territories, along with representatives from the Australian Animal Health Laboratory (CSIRO) and the Department of Agriculture, Water and the Environment. There are also observers from Animal Health Australia, Wildlife Health Australia, and the New Zealand Ministry for Primary Industries. The committee provides advice to the National Biosecurity Committee on animal health matters, focusing on technical issues and regulatory policy. <i>See also</i> National Biosecurity Committee
Animal products	Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.
Approved disposal site	A premises that has zero susceptible livestock and has been approved as a disposal site for animal carcasses, or potentially contaminated animal products, wastes or things.
Approved processing facility	An abattoir, knackery, milk processing plant or other such facility that maintains increased biosecurity standards. Such a facility could have animals or animal products introduced from lower-risk premises under a permit for processing to an approved standard.

Term	Definition
At-risk premises	A premises in a restricted area that contains a live susceptible animal(s) but is not considered at the time of classification to be an infected premises, dangerous contact premises, dangerous contact processing facility, suspect premises or trace premises.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture and Water Resources who manages international animal health commitments and the Australian Government's response to an animal disease outbreak. <i>See also</i> Chief veterinary officer
AUSVETPLAN	Australian Veterinary Emergency Plan. Nationally agreed resources that guide decision making in the response to emergency animal diseases (EADs). It outlines Australia's preferred approach to responding to EADs of national significance, and supports efficient, effective and coherent responses to these diseases.
Carcase	The body of an animal slaughtered for food.
Carcass	The body of an animal that died in the field.
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. <i>See also</i> Australian Chief Veterinary Officer
Compartmentalisation	The process of defining, implementing and maintaining one or more disease-free establishments under a common biosecurity management system in accordance with OIE guidelines, based on applied biosecurity measures and surveillance, to facilitate disease control and/or trade.
Compensation	The sum of money paid by government to an owner for livestock or property that are destroyed for the purpose of eradication or prevention of the spread of an emergency animal disease, and livestock that have died of the emergency animal disease. <i>See also</i> Cost-sharing arrangements, Emergency Animal Disease Response Agreement
Consultative Committee on Emergency Animal Diseases (CCEAD)	The key technical coordinating body for animal health emergencies. Members are state and territory chief veterinary officers, representatives of CSIRO-AAHL and the relevant industries, and the Australian Chief Veterinary Officer as chair.
Control area (CA)	A legally declared area where the disease controls, including surveillance and movement controls, applied 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 incident according to need).
Cost-sharing arrangements	Arrangements agreed between governments (national and state/territory) and livestock industries for sharing the costs of emergency animal disease responses. See also Compensation, Emergency Animal Disease Response Agreement

Term	Definition
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 (DCP)	A premises, apart from an abattoir, knackery or milk processing plant (or other such facility) that, after investigation and based on a risk assessment, is considered to contain a susceptible animal(s) not showing clinical signs, but considered highly likely to contain an infected animal(s) and/or contaminated animal products, wastes or things that present an unacceptable risk to the response if the risk is not addressed, and that therefore requires action to address the risk.
Dangerous contact processing facility (DCPF)	An abattoir, knackery, milk processing plant or other such facility that, based on a risk assessment, appears highly likely to have received infected animals, or contaminated animal products, wastes or things, and that requires action to address the risk.
Declared area	A defined tract of land that is subjected to disease control restrictions under emergency animal disease legislation. There are two types of declared areas: restricted area and control area.
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 kill 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.
Disinsectation	The destruction of insect pests, usually with a chemical agent.
Disposal	Sanitary removal of animal carcasses, 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

Term	Definition
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 participatory decision making, risk management, cost sharing, the use of appropriately trained personnel and existing standards such as AUSVETPLAN. <i>See also</i> Compensation, Cost-sharing arrangements
Endemic animal disease	A disease affecting animals (which may include humans) that is known to occur in Australia. <i>See also</i> Emergency animal disease, Exotic animal disease
Enterprise	See Risk enterprise
Enzyme-linked immunosorbent assay (ELISA)	A serological test designed to detect and measure the presence of antibody or antigen in a sample. The test uses an enzyme reaction with a substrate to produce a colour change when antigen–antibody binding occurs.
Epidemiological investigation	An investigation to identify and qualify the risk factors associated with the disease. See also Veterinary investigation
Epidemiology	The study of disease in populations and of factors that determine its occurrence.
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.
General permit	A legal document that describes the requirements for movement of an animal (or group of animals), commodity or thing, for which permission may be granted without the need for direct interaction between the person moving the animal(s), commodity or thing and a government veterinarian or inspector. The permit may be completed via a webpage or in an approved place (such as a government office or commercial premises). A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. <i>See also</i> Special permit
In-contact animals	Animals that have had close contact with infected animals, such as noninfected animals in the same group as infected animals.
Incubation period	The period that elapses between the introduction of a pathogen into an animal and the first clinical signs of the disease.
Index case	The first case of the disease to be diagnosed in a disease outbreak. See also Index property
Index property	The property on which the index case is found. See also Index case

Term	Definition
Infected premises (IP)	A defined area (which may be all or part of a property) on which animals meeting the case definition are or were present, or the causative agent of the emergency animal disease is present, or there is a reasonable suspicion that either is present, and that the relevant chief veterinary officer or their delegate has declared to be an infected premises.
Local control centre	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 or the level of contamination of a site for remediation purposes. See also Surveillance
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
National Biosecurity Committee	A committee that was formally established under the Intergovernmental Agreement on Biosecurity (IGAB). The IGAB was signed on 13 January 2012, and signatories include all states and territories except Tasmania. The committee provides advice to the Agriculture Senior Officials Committee and the Agriculture Ministers' Forum on national biosecurity issues, and on the IGAB.
National Management Group (NMG)	A group established to approve (or not approve) the invoking of cost sharing under the Emergency Animal Disease Response Agreement. NMG members are the Secretary of the Australian Government Department of Agriculture, Water and the Environment as chair; the chief executive officers of the state and territory government parties; and the president (or analogous officer) of each of the relevant industry parties.
Native wildlife	See Wild animals
OIE Terrestrial Code	OIE <i>Terrestrial animal health code</i> . Describes standards for safe international trade in animals and animal products. Revised annually and published on the internet at: <u>www.oie.int/international-standard-setting/terrestrial-code/access-online</u> .
OIE Terrestrial Manual	OIE Manual of 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: www.oie.int/en/standard-setting/terrestrial-manual/access-online.
Operational procedures	Detailed instructions for carrying out specific disease control activities, such as disposal, destruction, decontamination and valuation.
Outside area (OA)	The area of Australia outside the declared (control and restricted) areas.
Owner	Person responsible for a premises (includes an agent of the owner, such as a manager or other controlling officer).
Polymerase chain reaction (PCR)	A method of amplifying and analysing DNA sequences that can be used to detect the presence of viral DNA.

Term	Definition
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.
Premises of relevance (POR)	A premises in a control area that contains a live susceptible animal(s) but is not considered at the time of classification to be an infected premises, suspect premises, trace premises, dangerous contact premises or dangerous contact processing facility.
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.
Proof of freedom	Reaching a point following an outbreak and post-outbreak surveillance when freedom from the disease can be claimed with a reasonable level of statistical confidence.
Quarantine	Legally enforceable requirement that prevents or minimises spread of pests and disease agents by controlling the movement of animals, persons or things.
Resolved premises (RP)	An infected premises, dangerous contact premises or dangerous contact processing facility that has completed the required control measures, and is subject to the procedures and restrictions appropriate to the area in which it is located.
Restricted area (RA)	A relatively small legally declared area around infected premises and dangerous contact premises that is subject to disease controls, including intense surveillance and movement controls.
Risk enterprise	A defined livestock or related enterprise that 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, artificial insemination centres, veterinary laboratories and hospitals, road and rail freight depots, showgrounds, field days, weighbridges and garbage depots.
Sensitivity	The proportion of truly positive units that are correctly identified as positive by a test. See also Specificity
Sentinel animal	Animal of known health status that is monitored to detect the presence of a specific disease agent.
Seroconversion	The appearance in the blood serum of antibodies (as determined by a serology test) following vaccination or natural exposure to a disease agent.
Serosurveillance	Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.
Serotype	A subgroup of microorganisms identified by the antigens carried (as determined by a serology test).
Serum neutralisation test	A serological test to detect and measure the presence of antibody in a sample. Antibody in serum is serially diluted to detect the highest dilution that neutralises a standard amount of antigen. The neutralising antibody titre is given as the reciprocal of this dilution.

Term	Definition
Slaughter	The humane killing of an animal for meat for human consumption.
Special permit	A legal document that describes the requirements for movement of an animal (or group of animals), commodity or thing, for which the person moving the animal(s), commodity or thing must obtain prior written permission from the relevant government veterinarian or inspector. A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. <i>See also</i> General permit
Specificity	The proportion of truly negative units that are correctly identified as negative by a test. See also Sensitivity
Stamping out	The strategy of eliminating infection from premises through the destruction of animals in accordance with the particular AUSVETPLAN manual, and in a manner that permits appropriate disposal of carcasses and decontamination of the site.
State coordination centre	The emergency operations centre that directs the disease control operations to be undertaken in a state or territory.
Surveillance	A systematic program of investigation designed to establish the presence, extent 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 (SP)	Temporary classification of a premises that contains a susceptible animal(s) not known to have been exposed to the disease agent but showing clinical signs similar to the case definition, and that therefore requires investigation(s).

Term	Definition
Swill	Also known as 'prohibited pig feed', material of mammalian origin, or any substance that has come in contact with this material; it does not include:
	 milk, milk products or milk byproducts, either of Australian provenance or legally imported for stockfeed use into Australia
	 material containing flesh, bones, blood, offal or mammal carcases that is treated by an approved process¹
	 a carcass or part of a domestic pig, born and raised on the property on which the pig or pigs that are administered the part are held, that is administered for therapeutic purposes in accordance with the written instructions of a veterinary practitioner
	 material used under an individual and defined-period permit issued by a jurisdiction for the purposes of research or baiting.
	¹ Refer to jurisdictional legislation for approved processes. Jurisdictions may have approved processes that meet the following minimum standards:
	 rendering in accordance with the Australian Standard for the Hygienic Rendering of Animal Products
	 under jurisdictional permit, cooking processes subject to compliance verification that ensure that an internal temperature of at least 70 °C for a minimum of 30 minutes, or equivalent, has been reached
	 treatment of cooking oil that has been used for cooking in Australia, in accordance with the National Standard for Recycling of Used Cooking Fats and Oils Intended for Animal Feeds
	• under jurisdictional permit, any other nationally agreed process approved by the Animal Health Committee for which an acceptable risk assessment has been undertaken and that is subject to compliance verification.
	This definition was endorsed by the Agriculture Ministers' Council through AGMIN OOS 04/2014.
Swill feeding	Also known as 'feeding prohibited pig feed', it includes:
	 feeding, or allowing or directing another person to feed, prohibited pig feed to a pig
	 allowing a pig to have access to prohibited pig feed
	 the collection and storage or possession of prohibited pig feed on a premises where one or more pigs are kept
	 supplying to another person prohibited pig feed that the supplier knows is for feeding to any pig.
	This definition was endorsed by the Agriculture Ministers' Council through AGMIN OOS 04/2014.
Trace premises (TP)	Temporary classification of a premises that contains susceptible animal(s) that tracing indicates may have been exposed to the disease agent, or contains contaminated animal products, wastes or things, and that requires investigation(s).

Term	Definition
Tracing	The process of locating animals, people or other items that may be implicated in the spread of disease, so that appropriate action can be taken.
Unknown status premises (UP)	A premises within a declared area where the current presence of susceptible animals and/or risk products, wastes or things is unknown.
Vaccination	Inoculation of individuals with a vaccine to provide active immunity.
Vaccine	A substance used to stimulate immunity against one or several disease-causing agents to provide protection or to reduce the effects of the disease. A vaccine is prepared from the causative agent of a disease, its products or a synthetic substitute, which is treated to act as an antigen without inducing the disease.
– adjuvanted	A vaccine in which one or several disease-causing agents are combined with an adjuvant (a substance that increases the immune response).
– attenuated	A vaccine prepared from infective or 'live' microbes that are less pathogenic but retain their ability to induce protective immunity.
– gene deleted	An attenuated or inactivated vaccine in which genes for non-essential surface glycoproteins have been removed by genetic engineering. This provides a useful immunological marker for the vaccine virus compared with the wild virus.
– inactivated	A vaccine prepared from a virus that has been inactivated ('killed') by chemical or physical treatment.
– recombinant	A vaccine produced from virus that has been genetically engineered to contain only selected genes, including those causing the immunogenic effect.
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A <i>biological</i> vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A <i>mechanical</i> 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
Viraemia	The presence of viruses in the blood.
Wild animals	
– native wildlife	Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials).
– feral animals	Animals of domestic species that are not confined or under control (eg cats, horses, pigs).
– exotic fauna	Nondomestic animal species that are not indigenous to Australia (eg foxes).
Wool	Sheep wool.
Zero susceptible species premises (ZP)	A premises that does not contain any susceptible animals or risk products, wastes or things.

Term	Definition
Zoning	The process of defining, implementing and maintaining a disease-free or infected area in accordance with OIE guidelines, based on geopolitical and/or physical boundaries and surveillance, to facilitate disease control and/or trade.
Zoonosis	A disease of animals that can be transmitted to humans.

Abbreviations

Disease-specific abbreviations

Abbreviation	Full title	
ASF	African swine fever	
CSF	classical swine fever	
NVD	National Vendor Declaration	
Standard AUSVETPLAN abbreviations		

Standard AUSVETPLAN abbreviations

Abbreviation	Full title
AAHL	Australian Animal Health Laboratory
AN	assessed negative
APF	approved processing facility
ARP	at-risk premises
AUSVETPLAN	Australian Veterinary Emergency Plan
СА	control area
CCEAD	Consultative Committee on Emergency Animal Diseases
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	chief veterinary officer
DCP	dangerous contact premises
DCPF	dangerous contact processing facility
EAD	emergency animal disease
EADRA	Emergency Animal Disease Response Agreement
EADRP	Emergency Animal Disease Response Plan
EDTA	ethylenediaminetetraacetic acid (anticoagulant for whole blood)
ELISA	enzyme-linked immunosorbent assay
GP	general permit
IETS	International Embryo Transfer Society
IP	infected premises
LCC	local control centre
NMG	National Management Group
OA	outside area
OIE	World Organisation for Animal Health
PCR	polymerase chain reaction

Abbreviation	Full title
POR	premises of relevance
RA	restricted area
RP	resolved premises
SCC	state coordination centre
SP	suspect premises
SpP	special permit
ТР	trace premises
UP	unknown status premises
ZP	zero susceptible stock premises
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