AUSTRALIAN VETERINARY EMERGENCY PLAN

AUSVETPLAN

1996

Disease Strategy

Swine vesicular disease

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

Agriculture and Resource Management Council of Australia and New Zealand

This Disease Strategy forms part of:

AUSVETPLAN Edition 2.0, 1996

[AUSVETPLAN Edition 1.0, was published in 1991]

This strategy will be reviewed regularly. Suggestions and recommendations for amendments should be forwarded to the AUSVETPLAN Coordinator (see Preface).

Record of amendments to this manual:

There are occasional minor differences in the page breaks between the paper and this electronic version which we can unfortunately not avoid.

ISBN 0 642 24506 1

PREFACE

This **Disease Strategy** for the control and eradication of **swine vesicular disease** (SVD) is an integral part of the **Australian Veterinary Emergency Plan**, or AUSVETPLAN (Edition 2.0). AUSVETPLAN structures and functions are described in the **Summary Document**.

This strategy sets out the disease control principles that were approved in February 1991 by the then Australian Agricultural Council at meeting number 135, for use in a veterinary emergency caused by the introduction of SVD to Australia. It was updated and approved by the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) out-of-session in January 1996.

SVD is designated as a List A disease by the Office International des Epizooties (OIE). List A diseases are, 'Communicable diseases which have the potential for serious and rapid spread, irrespective of national borders; which are of serious socioeconomic or public health importance and which are of major importance in the international trade of animals and animal products'. The principles contained in this document for the diagnosis and management of an outbreak of SVD conform with the **OIE International Animal Health Code 1992** (OIE Code; see Appendix 3).

SVD is included in the list of diseases for which arrangements exist under the Commonwealth/States cost-sharing agreement for the eradication of certain exotic animal diseases. Information on the cost-sharing arrangements can be found in the AUSVETPLAN **Summary Document** and in the **Valuation and Compensation Manual.**

Detailed instructions for the field implementation of the strategies are contained in the AUSVETPLAN **Operational Procedures Manuals** and the **Management Manuals**. Cross references to strategies, manuals and other AUSVETPLAN documents are expressed in the form:

> Document Name, Section no.
> For example, **Decontamination Manual, Section 3**.

In addition, *Exotic Diseases of Animals: A Field Guide for Australian Veterinarians* by W.A. Geering, A.J. Forman and M.J. Nunn, Australian Government Publishing Service, Canberra, 1995 (**Exotic Diseases Field Guide**) is a source for some of the information about the aetiology, diagnosis and epidemiology of the disease and should be read in conjunction with this strategy.

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

The AUSVETPLAN Coordinator
Animal Diseases/Incidents Section
Livestock and Pastoral Division
Department of Primary Industries and Energy
GPO Box 858
Canberra ACT 2601
Tel: (06) 272 5540; Fax: (06) 272 3372

Membership of writing group

Laurie Denholm (convenor)	NSW Agriculture
Ian Bell (previous convenor)	NSW Agriculture
David Kennedy	NSW Agriculture
Harvey Westbury	Australian Animal Health Laboratory, VIC
Bob Cottam	Department of Primary Industries, QLD

Previous members:

Ian Roth	NSW Agriculture

The writing group was responsible for drafting this strategy. However, the text may have been amended at various stages of the consultation/approval process and the policies expressed in this version do not necessarily represent the views of all members of the writing group. Contributions may also have been made by other people not listed above and the assistance of all involved is gratefully acknowledged.

CONTENTS

1 NATURE OF THE DISEASE

Swine vesicular disease (SVD) is an acute, highly contagious virus disease of pigs. The disease is characterised by the formation of vesicles, on the feet and lower limbs and to a lesser extent on the snout, which are clinically indistinguishable from those caused by foot-and-mouth disease (FMD). The SVD virus is highly resistant to inactivation, a feature of major importance in the epidemiology and control of the disease.

1.1 Aetiology

SVD is caused by an enterovirus of the family Picornaviridae. There is only one serotype, although minor antigenic differences have been noted between some isolates. Isolates vary in virulence.

1.2 Susceptible species

Clinical disease has only been observed in pigs.

Small amounts of virus may be recovered intermittently from pharyngeal and rectal swabs and in milk from cattle housed with experimentally-infected pigs. There is some indication of virus growth in in-contact sheep, as virus can be recovered from the pharynx for up to 6 days after exposure, and such sheep develop antibody (Callender 1978). Nervous signs may be produced in infant mice by inoculation (Watson 1981). Mink may be susceptible to infection (Sahu 1987).

SVD virus is related to human Coxsackie virus and respiratory, signs possibly due to the virus, have been reported in people working with SDV virus in the laboratory.

1.3 World distribution and occurrence in Australia

The disease was first recognised in Italy in 1966. An outbreak occurred in Hong Kong in 1971 followed by simultaneous outbreaks in Britain, Austria and Poland in 1972. Since then the disease has occurred in several European countries and also Japan and Taiwan. The disease is not present in North, Central or South America, although it may be present but not confirmed in some countries in Asia.

There have been no occurrences in Australia.

1.4 Diagnostic criteria

[For terms not defined in the text see Glossary]

SVD is clinically indistinguishable from the other vesicular diseases of pigs, notably FMD. Any vesicular disease in pigs must be regarded as suspicious of FMD until proven otherwise. Recent or concurrent disease in other livestock, especially cattle and horses, should be investigated to assist differential diagnosis.

1.4.1 Clinical signs

The clinical signs of SVD are often mild and easily missed, particularly in muddy yards or in automated piggeries where the animals are infrequently observed, and affected pigs recover rapidly. Lesions may only be detected when animals are individually examined. Signs and lesions tend to be more severe in pigs housed on rough or hard surfaces.

The earliest clinical signs are fever and loss of appetite, which last for one to three days. Affected pigs are lethargic and unwilling to stand. Pregnant sows may abort.

Blanched epithelium and blisters (vesicles) appear around the coronary bands of the digits, ranging from small single lesions to numerous coalescing blisters encompassing the whole coronary band. The vesicles rupture easily within 36 hours, leaving a shallow ulcer with ragged epithelial edges that quickly granulate. Affected animals may be acutely lame, but this is not a constant feature even with severe foot lesions. The coronary band, horn and sole may separate from the underlying tissue, but the hoof rarely sloughs. The line of separation appears as a dark horizontal line that progressively moves down the hoof with new horn growth. Cracked walls are common, and the digits may overgrow.

The amount of new horn growth on the claws of recovered animals can provide a guide to how long infection has been present in a herd (Henderson 1947). Seven days should be allowed for the incubation period and 7 days for lesions to mature and new horn growth to commence, thence horn growth of 2 millimetres per week in weaners and 1 millimetre in sows. All 8 (cleaned) claws on several pigs should be examined. If many claws have lesions of similar age, then the time of introduction of infection can be estimated.

Lesions may extend to the skin of the lower limb and occasionally the abdomen, thorax and teats. These lesions may appear more necrotic than vesicular. In about 10% of cases, vesicles develop on the snout, but rarely in the mouth. Snout lesions are sometimes haemorrhagic in appearance. Tongue lesions rupture and heal quickly. The development and distribution of lesions is related to trauma.

Diarrhoea, central nervous signs, encephalitis and myocarditis have been reported.

Morbidity may approach 100% but mortality is negligible.

1.4.2 Pathology

Gross lesions

These lesions are restricted to vesicle formation and resolution.

Microscopic lesions (histopathology)

The histopathology of these lesions cannot be differentiated from that of FMD. A mild to moderate diffuse encephalomyelitis with perivascular cuffing and the formation of neuroglia foci has been described in experimentally-produced disease (Geering et al 1995).

1.4.3 Laboratory tests

Animal specimens should initially be sent to the State or Territory diagnostic laboratory from where they will be forwarded to the Australian Animal Health Laboratory (AAHL), Geelong for exotic disease testing after obtaining the necessary clearance from the chief veterinary officer (CVO) of the State or Territory of the disease outbreak and informing the CVO of Victoria (for transport of the specimens to Geelong).

Specimens required

Specimens required include vesicular fluid, vesicular lesion epithelial coverings or flaps, whole blood, sera and, from dead animals, fresh and formalised samples from several tissues, including brain.

Transport of specimens

Unpreserved tissues and blood specimens should be chilled and forwarded to the laboratory with frozen gel packs. If delays in transit of more than 48 hours are expected, these specimens should be forwarded packed with dry ice. For further information see the **Laboratory Preparedness Manual, Section 6 and Appendix 3**.

Laboratory diagnosis

AAHL tests. Laboratory tests are essential for rapid confirmation of SVD and the exclusion of FMD. The diagnostic tests currently available at AAHL are shown in Table 1 and include ELISA that can rapidly detect viral antigens and provide a diagnosis within 2–4 hours. A range of cell cultures can be used for virus isolation and subsequent characterisation. Serological tests, including serum neutralisation, are useful during tracing, epidemiological studies and surveillance.

Table 1 Diagnostic tests currently available for swine vesicular disease

Test	Specimen required	Test detects	Time taken to obtain result
ELISA	vesicular fluid or epithelium	viral antigen	2–4 hours
Electron microscopy	tissue	antigen	2–4 hours
Virus isolation and identification	tissues / vesicular fluid	virus	2–4 days
Serum neutralisation	serum	antibody	3 days

Source: Information supplied by AAHL, 1995 [refer to AAHL for the most up-to-date information].

1.4.4 Differential diagnosis

The following diseases and conditions with clinical signs or lesions similar to SVD need to be considered in the differential diagnosis.

Exotic viral diseases:

- foot-and-mouth disease (FMD)
- vesicular stomatitis (VS)
- vesicular exanthema (VE)

Dermatitis:

- scalding, wetting, contact dermatitis, photosensitisation

Phytophotodermatitis:

- contact with certain plants containing furocoumarins (especially Umbelliferae — parsnips, celery, parsley) resulting in photosensitisation (Pathak et al 1962, Montgomery et al 1987a, b)

Lameness:

- laminitis, bad floors, new concrete, mud, erysipelas

1.5 Resistance and immunity

1.5.1 Innate and passive immunity

Subclinical infection may occur if pigs are exposed to small amounts of virus, particularly by inhalation or ingestion. Stress may increase susceptibility to infection or the severity of disease. Young pigs tend to show more severe clinical signs than older pigs.

1.5.2 Active immunity

Swine that have recovered from the disease have antibodies that protect them from reinfection (Fenner et al 1987). On some properties, the disease apparently runs its course and, once all animals are infected, peters out. On other properties, two waves of disease approximately three months apart have been observed.

1.5.3 Vaccination

Effective experimental vaccines include inactivated adjuvanted vaccines and attenuated ('live') vaccines based on temperature-sensitive mutants (Watson 1981, Panina et al 1983).

1.6 Epidemiology

Key factors in the epidemiology of SVD are:

- the virus is highly resistant to inactivation (see Section 1.6.2);
- pigs are mainly infected by ingestion of infected feedstuff, by direct contact with infected pigs, or by contact with contaminated surfaces (see Section 1.6.3);
- the disease may be mild and difficult to detect (see Section 1.7).

1.6.1 Incubation period

The incubation period in natural outbreaks is 2–7 days. Experimentally-infected pigs develop lesions within 48 hours of intradermal inoculation into the foot, followed by generalisation of the disease within 72 hours. The OIE Code (1992; see Appendix 3) recommends that, for regulatory purposes, the maximum incubation period be regarded as 28 days.

1.6.2 Persistence of agent

General properties/environment

SVD virus is highly resistant to inactivation, a feature of great epidemiological significance. The virus is:

- relatively stable over a pH range of 2–12 depending on time and temperature (Mann 1981);
- more resistant to heating and desiccation than FMD virus (Geering et al 1995); and
- able to withstand freezing but is destroyed by a temperature of 69°C (Loxam and Hedger 1983).

SVD virus is lipid-free and resists treatment with detergents and many commonly used disinfectants, and in the presence of organic matter, it resists desiccation. It is protected by manure, fats and other organic matter, which must be completely removed during cleaning. Infective virus has been found in crevices in farm buildings for up to 11 weeks after rigorous cleaning and disinfection (see Section 2.2.8).

Live animals

Viraemia occurs, during which skin, muscle and lymph nodes contain much virus. Large quantities of virus are shed in vesicular fluids and other body excretions and secretions, starting within 1 day of infection (during the incubation period) and peaking within several days. Shedding usually ceases within 14 days, but can continue for up to 3 months, especially in faeces. The infectivity of affected pigs is low after a month. There is little evidence that the virus perpetuates in chronically or latently-infected carrier animals, and the disease will eventually disappear from a herd if left to run its course. No reservoir hosts are known.

Animal products and by-products

- The SVD virus is able to survive almost indefinitely in refrigerated or frozen pigmeat and has been shown to persist in the muscle of frozen pig carcases for at least 11 months (MacDiarmid 1991).
- In lactic acid-cured smoked salami and pepperoni sausages, SVD virus was still detectable after 400 days (MacDiarmid 1991). In processed intestinal casings it has survived for at least 780 days (Loxam and Hedger 1983).

Fomites

The virus can survive for many months in contaminated buildings, vehicles and on pastures. It can survive in pig faeces for at least 138 days (Geering et al 1995).

1.6.3 Modes of transmission

Swill feeding

Outbreaks usually start by pigs becoming infected by contact with or ingestion of feed containing infected pork products. Swill feeding has been responsible for most primary outbreaks, and has also contributed to the subsequent spread or recurrent outbreaks of the disease in many countries. The disease entered the United Kingdom in pork from Hong Kong illegally imported via Denmark.

Live animals

The virus enters the host through damaged epithelia, usually the skin of the feet and multiplies in epithelial cells. When exposed to large amounts of virus, pigs can also become infected, by ingestion, through the tonsils and digestive mucosa.

The disease spreads rapidly by direct contact between pigs. The movement of infected preclinical or mildly affected pigs is the major factor in the secondary spread of disease during an outbreak.

There is no evidence for vertical transmission or the carrier state.

Although experimental infection of sheep and cattle with SVD has been reported, these species do not appear to have played any part in disease transmission in the field (Callender 1978).

Artificial breeding

Spread via semen is unlikely. Preliminary evidence shows transmission via embryos is unlikely if correct handling and transfer procedures are followed, however additional experimental work is necessary to substantiate these findings (see the **Artificial Breeding Centres Enterprise Manual**).

Effluent and fomites

Indirect spread from pen to pen or farm to farm can occur via materials contaminated with infected faeces or urine, but this form of transmission is erratic. However, many outbreaks have been associated with the movement of pigs in contaminated vehicles. Most spread within a farm is due to movement of pigs between pens or the existence of a common open drainage system.

Effluent from infected piggeries that drains onto roads, pastures or into creeks could infect or contaminate animals, vehicles, equipment or people coming into contact with it. Disease could spread via contaminated piggery drinking water supplies.

Wild animals/vectors

Mechanical spread by people, rodents, insects and birds can occur but is of relatively minor importance. Infected pigs can readily enter the food chain. Lesions would rarely if ever be observed during processing, and in the United Kingdom the disease has never been reported from abattoirs.

Windborne spread

Unlike FMD, airborne transmission of SVD is not a significant feature. However, the spraying of contaminated effluent onto pastures could result in airborne spread for a short distance downwind.

1.6.4 Factors influencing transmission

SVD virus is stable over a range of environmental temperatures. However, it survives longer at cooler temperatures, so indirect transmission may be enhanced in cooler weather conditions.

Watson (1981) analysed the origin of 474 outbreaks of SVD in the United Kingdom. The relative importance of different sources of infection were: movement of pigs in contaminated transport (20%), movement of pigs from infected premises (16%), swill (15%), market contacts (12%), movement of personnel (4%), local spread (3%), residual contamination on previously infected but cleaned premises (3%), movement of non-livestock vehicles (3%), contaminated bakery waste (<1%), and obscure (23%).

1.7 Manner and risk of introduction

The most likely route of entry of SVD into Australia is via contaminated pork products illegally swill-fed to domestic pigs or to which wild pigs might gain access. The initial outbreak could well go unnoticed and uncontrolled, particularly in wild pigs, if the signs in domestic pigs were mild, or if the owner was reluctant or slow to report sick pigs. The disease could spread widely with pig movements and could gain a substantial foothold before coming to the attention of regulatory authorities.

2 PRINCIPLES OF CONTROL AND ERADICATION

2.1 Introduction

As a clinical disease, SVD is of minor economic importance (Callender 1978). However, its clinical confusion with FMD and the implication this has for FMD control or eradication policies, makes it an important disease. It is virtually impossible for a country to have an effective FMD eradication policy in the presence of SVD.

As for any exotic vesicular disease, the immediate response to a suspected outbreak of SVD should be based on the assumption that it is FMD (see the **Foot-and-Mouth Disease Strategy, Section 3**). However, it may be economically and politically prudent to enact a more discrete response pending differential diagnosis.

If a diagnosis of SVD is confirmed, control would rely on:

- early recognition and diagnosis of cases;
- preventing direct and indirect contact between infected and susceptible animals;
- eliminating infection by slaughter and decontamination (ie stamping out); and
- preventing recycling of infection through the porcine food chain.

A stamping-out policy would involve the following components:

- imposing rigid quarantine to control the movement of pigs, people, vehicles, equipment and pig products, especially over infected and dangerous contact premises and risk enterprises (see Section 2.2.1; Appendixes 1 and 2);
- urgent identification of infected and dangerous contact premises (see Appendix 1). This involves meticulous tracing of contacts with infected herds, repeated inspections and intense surveillance in the areas involved. Serological surveys are essential (see Section 2.2.2 and 2.2.3);
- prompt destruction and disposal of animals infected with or exposed to SVD virus (see Sections 2.2.5 and 2.2.7);
- thorough cleaning and disinfection of the premises and of materials possibly contaminated with virus (see Section 2.2.8);
- testing the premises for residual contamination by restocking with sentinel pigs (see Section 2.2.12).

Considerable difficulty was experienced in the United Kingdom in eradicating SVD (Watson 1981). This was due to a combination of factors, notably the difficulty of detecting infection due to the mild signs and lesions; the resistance of the virus and its persistence on infected properties and in vehicles used to carry infective pigs; and swill feeding of pigs.

2.2 Methods to prevent spread and eliminate pathogens

It is very important that the sequence and timing of operations is such that the greatest chance of eliminating SVD virus from infected premises (IP) is obtained. The first step is to ensure that the virus is contained on the IP. Strict movement controls must be imposed and effluent draining onto roads or into creeks must be stopped. The second and third

steps are to destroy infected animals and materials and eliminate virus from the IP by thorough decontamination procedures.

2.2.1 Quarantine and movement controls

Effective quarantine and movement controls are essential. Secondary spread of infection is most commonly due to the movement of infected pigs. By helping to prevent further spread of virus, movement controls increase the speed and likelihood of successful eradication, and reduce the cost of control programs and compensation payouts. Initially, stringent controls on the movement and congregation of pigs should be imposed. These may be relaxed once the situation has been fully assessed. The relaxation of restrictions may take the form of a movement slow-down policy whereby no pig can leave a property unless it has been on that property for at least 28 days and has not been in contact with other pigs that have arrived on the property during the previous 28 days.

Quarantine and movement controls should be imposed in declared areas as follows (for further details see Appendixes 1 and 2).

- *Infected premises (IP)* — a premises on which SVD is confirmed or presumed to exist — total movement control is imposed.
- *Dangerous contact premises (DCP)* — a premises containing susceptible animals that have been in direct or indirect contact with an IP or infected animals — total movement control is imposed.
- *Suspect premises (SP)* — Contains suspect animals that will be subjected to quarantine and strict surveillance for at least 28 days — provided there is no evidence of infection, the premises then reverts to normal status.
- *Restricted area (RA)* — imposed around all IPs and DCPs, including as many SPs as practical — a high level of movement control and surveillance will apply.
- *Control area (CA)* — A CA will be imposed around the RA. The purpose of the CA is to control movement of pigs and potentially contaminated vehicles etc, for as long as is necessary to complete trace-back and epidemiological studies. Less stringent movement control and surveillance will apply. Once the limits of the disease have been confidently defined, the CA boundaries and movement restrictions should be reduced.

Movement controls should be maintained to some degree until the disease is either eradicated or declared endemic.

Zoning

If SVD became endemic in only part of a country, it may be possible to establish infected and disease-free zones effectively sealed off from each other by extremely tight movement and quarantine controls. In the long term, it may be possible to eradicate SVD from the endemic zone.

2.2.2 Tracing

Urgent and meticulous trace-back and trace-forward of all contacts with infected pigs, premises, vehicles, equipment, people, pig products and other materials is vital if the disease is to be effectively contained. It is likely that the first reported case will not be the index case, and trace-back will identify other, earlier cases. Due the mildness of clinical signs, only 50% of United Kingdom outbreaks were reported by animal owners, most of

the others being detected by tracing (Watson 1981). For further details see the **Control Centres Management Manual Part 1/Section 4.4; Part 2/LRD 101**).

2.2.3 Surveillance

Surveillance during an outbreak should be carefully coordinated to optimise the available resources. Serological surveys are essential to establish the extent of the infection, and to locate mildly-infected herds that may have otherwise escaped detection. Surveillance will be most intense in the RA and will be driven by findings from the epidemiology unit. Factors such as potential spread by wild pigs could warrant increased surveillance in some areas. The intervals between inspections and surveys will depend on the observed incubation period and the resources available. Suspect premises should be inspected every third day. Every effort must be made to educate producers about the clinical signs and to report lesions.

2.2.4 Treatment of infected animals

There is no known specific cure for SVD. Palliative treatment may alleviate the signs, but will not prevent the spread of infection and may make the detection of infected animals more difficult.

2.2.5 Destruction of animals

Clinical cases should be destroyed first, followed by animals in direct contact, then those animals most removed. Efficient, humane procedures must be employed to kill pigs, without moving them from the site. Pigs on IPs and DCPs should preferably be slaughtered and disposed of on site.

For further details see the **Destruction of Animals Manual, Section 4.3.**

2.2.6 Treatment of animal products and by-products

Pig carcases, meats, products, offal and wastes from IPs, DCPs and SPs should preferably be disposed of on site, or (for SPs only) held on site until quarantine is lifted (Appendix 2).

Products heated to an internal temperature greater than 70°C can be considered to pose no risk as a vehicle for SVD virus. Lower temperatures may also be satisfactory for inactivating SVD virus in prepared meat products. SVD virus in the Italian meat product, ‘mortadelle’, was destroyed when the internal temperature of the product reached only 60° C (MacDiarmid, 1991).

Swill feeding

Outbreaks of SVD should be well-publicised, with emphasis on the dangers of feeding animal products to pigs and the fact that swill feeding is illegal. People caught feeding or providing material for swill should be promptly prosecuted and successful cases publicised. Security at municipal garbage tips should be improved to prevent wild pigs gaining access to domestic food scraps.

2.2.7 Disposal

The preferred method of disposal of carcases and other contaminated material is by incineration on the property. Another option is clean removal of carcases to plants for heat treatment and subsequent salvage of animal protein, provided leakage does not occur

during transport, the product does not enter animal or human food chains before adequate processing, and cross-contamination between treated and untreated products is prevented.

The virus remains viable in buried carcases for many months, so if this disposal method is used, care must be taken to ensure that the carcases are buried deeply so that they will not be re-exposed and that the pit does not discharge effluent. The disposal area should be fenced off to prevent access by wild pigs. For further information see the **Disposal Procedures Manual, Section 3.1 and 3.3.**

2.2.8 Decontamination

Equipment, buildings and other materials that may harbour infection must be thoroughly cleaned and disinfected. This is the most critical step, given the durability of the virus, and will be a protracted, labour-intensive and expensive process. If disinfection cannot be achieved effectively and quickly, then contaminated materials, equipment and buildings should be destroyed.

Due to the high resistance of SVD virus to inactivation, thorough cleaning and disinfection is difficult to perform. The following procedure has been used successfully in the United Kingdom (Mann 1981). Dead pigs and infected pens were sprayed with an alkaline disinfectant, then carcases, manure and other debris removed. All surfaces were thoroughly cleaned with an industrial detergent based on sodium metasilicate, heat-treated with flame guns, and sprayed while still warm with 1% sodium hydroxide. After 48 hours the surfaces were washed with water. Fourteen days later a further caustic soda spray was applied, followed by a wash.

Items that cannot be destroyed or treated with corrosive chemicals should be disinfected by less damaging means but treated as possible hazards. Vehicles used to transport infected pigs, carcases and materials must be thoroughly cleaned and disinfected between loads, using approved chemicals and procedures under supervision. Cleaning must not be left to the operator. Approved locations for cleaning and disinfection should be designated and staffed by trained personnel.

For further information see the **Decontamination Manual, Tables 2.8, 3.18 and 4.**

2.2.9 Vaccination

Vaccination has not been widely used as an adjunct to SVD control and eradication.

2.2.10 Wild animal control

Australia has large and widespread populations of wild pigs, which can come into close contact with extensively-housed domestic stock and pose a considerable threat to exotic disease control. Because of their potential to harbour and spread SVD virus, an outbreak of SVD involving wild pigs in Australia may have serious consequences, delaying the detection of disease, increasing the rate and extent of an outbreak, complicating and delaying disease eradication, and compromising demonstration of disease freedom (Wilson and O'Brien 1989).

The actual or potential role of wild pigs must be assessed early in an outbreak. The likelihood of contact between wild and infected domestic pigs should be determined. If contact could have occurred, trapping, baiting and/or shooting operations should be carried out in the vicinity of IPs to detect SVD in wild pigs. If clinical, serological or virological evidence of SVD is found, then more extensive and systematic epidemiological

studies should be undertaken to monitor the extent and spread of the disease in wild pig populations, and to determine whether the disease initially and subsequently spread from domestic to wild animals or vice versa.

If wild pigs are considered to be a risk factor in the dissemination or persistence of infection, then programs aimed at reducing contact between infected stock, wild pigs and uninfected susceptible stock should be instigated as soon as possible. This might involve improved fencing around piggeries and garbage tips, or containing, reducing or eliminating without dispersal, wild populations in the RA and CA. The best method or combination of methods would depend on the prevailing circumstances, including the distribution and abundance of pigs, the terrain, and the availability of suitable labour and equipment.

If SVD is confirmed in wild pigs, the source of infection and method of spread must be determined. If wild pigs are being infected only by domestic pigs, it is possible that, once the domestic source is eliminated, the infection might die out naturally in low density populations. If wild pigs are a primary source of virus or infection is being maintained in wild populations, then monitoring and control programs must be instigated. This might involve containing or reducing the population to a level where the disease is unlikely to be transmitted and may die out. Models have been developed to predict the threshold population densities and cull rates at which FMD should die out in wild pig populations (Davidson 1990). Such models could probably be adapted to SVD.

For further details on wild pig population surveys, containment, control, and disease surveillance, see the **Wild Animal Control Manual, in press.**

2.2.11 Vector control

Vector control is not applicable for SVD.

2.2.12 Sentinel and restocking measures

Since SVD has been found on premises even after vigorous attempts at disinfection, restocking should be carried out cautiously. Eight weeks after final disinfection, susceptible pigs (in the order of 10% of full stock numbers) should be placed in contact with all previously-contaminated areas and observed closely for 4 weeks. If there are no signs or serological evidence of infection by then, full restocking should be allowed. However, monitoring and movement controls should be maintained for a further 4 weeks.

2.2.13 Public awareness

A media campaign must emphasise the importance of farmers inspecting susceptible animals regularly and of reporting suspicious lesions and unusual deaths promptly. The public must not be panicked into avoiding meat products. The ban on swill feeding should be reinforced as well as the need to avoid contact between domestic and feral pigs. The importance of movement controls, and what this means to individuals, needs to be strongly emphasised. For further information see the **Public Relations Manual**.

2.3 Feasibility of control in Australia

Conventional stamping-out procedures have been shown to eradicate SVD in the United Kingdom although this was with difficulty. Eradication is difficult due to resistance of the virus to inactivation, its capacity to be spread by fomites and also within the food chain and the fact that many cases of the disease are mild enough to go unnoticed initially allowing movement and spread of the virus.

The disease may be difficult or impossible to eradicate if it became well established in the feral pig population of Australia (Geering 1990).

3 POLICY AND RATIONALE

3.1 Overall policy for swine vesicular disease

Swine vesicular disease (SVD) is an OIE List A disease that has the potential for rapid spread with significant production losses and is of major importance in the trade in pigs and pig products. It can be confused with FMD.

The policy is to eradicate SVD in the shortest possible period, while limiting economic impact, using a combination of strategies including:

- ***rapid identification of the virus*** **to differentiate it from foot-and mouth disease (FMD).**
- ***stamping out,*** **which involves quarantine, slaughter of all infected and exposed susceptible animals on infected premises, and sanitary disposal of destroyed animals and contaminated animal products, to reduce the source of infection;**
- ***quarantine and movement controls*** **on animals, animal products and things in declared areas to prevent spread of infection;**
- ***decontamination*** **of facilities, products and things to eliminate the virus on infected premises and to prevent spread in declared areas;**
- ***tracing and surveillance*** **to determine the source and extent of infection and to provide proof of freedom from the disease;**
- ***zoning*** **to define infected and disease-free areas; and**
- ***an awareness campaign*** **to facilitate cooperation from industry and the community.**

SVD is one of the most serious exotic pig diseases. The virus is highly resistant to inactivation and decontamination has to be carried out very thoroughly. The clinical signs in pigs are similar to those seen with FMD and early differential diagnosis is extremely important. Delay in the definitive diagnosis may have a major effect on international trade for a range of commodities until FMD is excluded. If the disease becomes established, ongoing recurrent outbreaks would result in periodic disruption to our international markets. Zoning, under these circumstances, would be a major advantage.

SVD is included in the Commonwealth/States cost-sharing agreement.

The CVO(s) in the State(s)/Territory(s) in which the outbreak(s) occurs will be responsible for implementing disease control measures (in accordance with relevant legislation), and will make ongoing decisions on follow-up disease control measures in consultation with the Consultative Committee on Exotic Animal Diseases (CCEAD), the State/Territory and Commonwealth governments, and representatives of the affected industries. The detailed control measures adopted will be determined using the principles of control and eradication (Section 2) and epidemiological information about the outbreak. For further information on the responsibilities of the State/Territory disease control headquarters and local disease control centre(s), see the **Control Centres Management Manual, Part 1, Sections 3 and 4**.

3.2 Strategy for control and eradication

The strategy selected will depend on a thorough assessment of the situation at the time. The strategy will need to be reassessed during the course of an outbreak and altered if necessary.

The disease is spread rapidly by direct contact, it often appears as a mild disease and is difficult to detect, the virus is highly resistant to inactivation and clinical disease resembles FMD in pigs. The selected strategies must be directed to containing and eliminating the virus based on these factors.

The strategies will be to slaughter out all infected and in-contact animals, quickly impose strict quarantine and movement controls on pigs, people, infected products, vehicles and fomites, and rapidly undertake diagnosis, tracing and surveillance and strict, and detailed, decontamination.

The stamping-out strategy is likely to be opposed because of the mild nature of the disease and the low mortality. Close liaison with the industry will be essential to ensure that it is fully informed of the consequences of the disease to the whole of Australian animal industries and the control strategies to be used. The media can also be useful in advising the public of the safety of products and to attempt to maintain confidence in the industry by being provided with honest and correct information.

3.2.1 Stamping out

The preferred option is to eradicate the disease quickly through a stamping-out policy. The possibility of confusion with FMD makes the presence of SVD in Australia of major concern and its eradication of vital importance. Should SVD become endemic, we may risk sporadic disruptions to international trade in cattle, sheep, pigs and their products with potentially serious economic consequences far out-weighing the eradication costs of the disease.

All pigs on the IP will be slaughtered together with all dangerous contact animals and those in the same shed. The decision to slaughter out all animals on the DCP will depend on the degree of isolation of the dangerous contact animals from animals in other sheds and animals on the premises and the work practices in place.

The disease could be eradicated through destocking by commercial processing as soon as practicable. The disease has been observed to disappear from a herd when left to run its course. This strategy may be applicable to outbreaks in well-isolated piggeries provided movement controls could be effectively maintained for a prolonged period. Infected sheds

or units could be quarantined from the rest of the property and animals from these isolated sheds subject to slaughter out and disposal. Pigs from other isolated and 'free' sheds may then be slaughtered commercially, after the proper and satisfactory surveillance and inspection period and the farm progressively destocked, decontaminated and restocked. Abattoirs, effluent disposal, feed trucks and other property movements would all have to be strictly controlled. However, this destocking strategy would be risky if quarantine and movement controls broke down for any reason. It is, therefore, not recommended unless strict controls can be imposed and maintained over a period of time.

3.2.2 Quarantine and movement controls

Direct contact with infected pigs and contaminated products and items and the highly persistent nature of the virus are the major means of spread. Quarantine and movement controls are important in containing the disease.

Infected, dangerous contact and suspect premises must be quickly identified and placed under quarantine and movement controls imposed. These controls will be very intensive and movements, of other than people, after appropriate decontamination, will be limited and perhaps prohibited unless absolutely essential.

A restricted area and a control area will be declared. The area of the RA need not be large because of the method of spread of the disease but the RA must include the IPs and DCPs and as many SPs as possible. If wild pig populations are present within the RA and there is a likelihood that there may have been contact with domestic pigs then the boundary needs to be extended to include their territory.

The boundary of the CA will vary as the extent of the infection becomes better defined. In the first instant it may correspond to the State borders but should be a minimum of 10 km radius around the RA.

Strict movement controls will be imposed. The congregation of animals such as at pig sales and shows will be prohibited.

Any feeding of pig products to pigs must be stopped.

It is possible that sheep and cattle may be serologically infected but their role in spread of the virus is not known. It will be prudent to insist that these animals be contained until after the infected pigs have been slaughtered, the premises decontaminated and the incubation period of 28 days has elapsed.

Respiratory signs have been seen in laboratory workers and the movements of people in RA must be controlled and restrictions imposed as necessary.

For further information see Appendixes 1 and 2.

Zoning

If the disease became established in wild pig populations, stamping out would be difficult to effect. The options available in this situation would be to require all domestic pigs to be housed in a manner that precluded their contact with wild pigs, and/or distinguish between infected and non-infected zones within Australia. Zoning could also be adopted if the disease was found to be, or became, widespread throughout part of the country to the extent that eradication could not be achieved within the foreseeable future.

The area of the infected zone should comply with minimum OIE requirements and the boundary should be at least a 10 km radius around the IP. Individual trading partners may

request additional measures in order to accept animals or animal products from the free area.

3.2.3 Treatment of infected animals

There is no treatment for the disease and because of the persistence of the virus all infected animals will be slaughtered and disposed of in the approved manner.

3.2.4 Treatment of animal products and by-products

The virus is very persistent in animal products and infected animal products, in particular swill, being fed to pigs is a major vehicle for the spread of the virus. Unlicensed swill feeding is illegal in Australia.

Product from infected animals and in-contact animals cannot be used for edible product either for humans or animals and must be disposed of in an approved manner.

Although heat treatment will effectively inactivate the virus the movement of infected product will lead to contamination and subsequent difficulty in eradicating the virus.

3.2.5 Vaccination

There is no useful role for vaccination in the control of SVD. During an eradication campaign, vaccination could hinder the detection of infection by masking clinical signs. The virus does not spread in a way that would make ring vaccination a useful tool in containing infection.

3.2.6 Tracing and surveillance

Tracing and surveillance will be very important because the disease may be present in the mild form and therefore difficult to detect. Inspections of animals on suspect premises and wide surveillance to detect sub-clinical or mild cases are necessary to ensure all suspect premises are identified.

It will be necessary to trace all live animals, products, people, vehicles and any items that may have been contaminated with virus during the period for 28 days before the first clinical signs were observed and up to the time that quarantine was imposed. Early identification and diagnosis to distinguish the outbreak from FMD will assist in defusing and correcting any trade disruption. Effluent must be controlled so that it does not contaminate areas outside of the IP. Effluent must not be used for spraying pastures due to the, albeit remote, possibility of wind-borne spread.

Surveillance must be ongoing and regular inspections of animals on SPs and DCPs must be undertaken to attempt to detect those animals not exhibiting normal clinical signs. Wild pigs must be included in any investigations.

Sentinel animals will be introduced not less than 28 days after depopulation and complete (and repeated if necessary) decontamination is achieved.

Following eradication, surveillance of the RA and CA must be adequate to provide information that the virus has been eliminated. Wild pig populations must be surveyed including strategic parts of the free areas. Meatworks should be used for surveillance, taking into consideration the age groups involved.

See Appendix 4 for further details.

3.2.7 Decontamination

The difficulty in inactivating the virus makes it very important to be thorough in the cleaning, disinfection and disposal of carcases, products and things. It may be necessary to repeat the decontamination program after a period of about two weeks, particularly where cracks and crevices are a problem and cleaning and disinfection is difficult.

Carcases will need to be burned if possible as the virus may survive for long periods in buried carcases. If carcases must be buried it will be necessary to ensure that they are disinfected, well covered and unlikely to erupt from the trenches, that any drainage is contained and that the areas are fully fenced to exclude wild pigs.

3.2.8 Wild animal control

If the disease is found to be present in wild pigs then a level of control will need to be imposed. It will be necessary to ensure that the wild pigs are not dispersed and that eradication methods to prevent this are used. It may be possible to reduce numbers to a level where the disease peter die out.

Fencing to ensure the separation of wild pigs from domestic herds will need to be erected. The control on garbage tips will need to be strengthened to prevent the entry of wild pigs and ensure the correct disposal of waste.

3.2.9 Media and public relations

The industry will need to be kept fully informed on the control measures to be used and the policies that have been agreed. There will be ongoing liaison with industry to include them in the decision making. The dangers of swill feeding must be emphasised. The media will be fully informed about the disease and the methods of control. The media can assist in correctly informing the public of the safety of the product and in attempting to maintain confidence in the product that is reaching the market.

3.3 Social and economic effects

The extent of the social and economic effects of SVD would depend on how quickly it was differentiated from FMD, the severity and location of the outbreak, and the speed with which it was contained and eradicated. Any confusion with FMD, if reported internationally, is likely to affect cattle, sheep and goat export industries at least in the short term.

The initial investigations of and responses to any vesicular disease in pigs should be performed rapidly but prudently until a differential diagnosis is obtained (within 48 hours of reporting). A carefully considered and balanced response must be made so as to contain infection through movement controls. Animal health staff must be alerted to an impending exotic disease campaign, whilst minimising speculation and alarm within the industry, media and general public.

If the disease is not eradicated new outbreaks will result in a vesicular disease investigation each time and perhaps confusion in international markets.

SVD could affect the viability of some producers due to lost markets. However, the overall effect on the pig industry and on the national economy would be minor compared

to a confirmed outbreak of FMD. The clinical effects of SVD are of little economic importance.

The gross value of pig production in Australia was $681 million in 1994 representing 4.8% of the total value of animal agricultural production. In 1994 Australia exported 7343 tonnes of pigmeat at a value of $28.2 million. New Zealand and Germany were the most significant importers of Australian pigmeat.

Because most of Australian pigmeat is consumed domestically, bans imposed by trading partners would have little economic effect. Restrictions on movements of products within and between States would be more significant, causing local surpluses or shortages of pigmeat with corresponding changes in domestic prices. Disruption to normal trade could reduce profitability throughout the industry.

Premises located in the RA and CA may lose market opportunities due to quarantine controls even though they are not infected. The slaughter of pigs and the long delay in repopulation will also result in financial loss.

3.4 Criteria for proof of freedom

The OIE Code states that a country is considered to be free from SVD when it has been shown that the disease has not been present for at least the past 2 years (see Appendix 3). This period may be reduced to 9 months where a stamping-out policy has been practised. An infected zone shall be considered as such until at least 60 days after the last case and following the completion of a stamping-out policy, or 12 months after the clinical cure or death of the last affected animal if a stamping-out policy is not practised.

If SVD was identified in wild pigs, it would also be necessary to demonstrate freedom in those populations.

Widespread surveillance will be required to gain the information necessary to present to the international community to demonstrate freedom from the disease (see Appendix 4).

3.5 Funding and compensation

Swine vesicular disease is included in the list of diseases for which arrangements exist under the Commonwealth/States cost-sharing agreement for the eradication of certain exotic animal diseases. Information on the cost-sharing arrangements can be found in the AUSVETPLAN **Summary Document, Appendix 3** and in the **Valuation and Compensation Manual.**

3.6 Strategy if the disease becomes established

It is unlikely that SVD would become endemic in Australia such that, in the long term, eradication was either not feasible or uneconomic. The disease is likely to disappear from a herd if reinfection is prevented and the decontamination of the premises is thorough. The situation could arise, however, where SVD was regarded as an endemic disease in certain areas or in wild pig populations for a period of time, pending the development and application of long-term eradication strategies. Under these circumstances, zoning could be adopted in an attempt to contain the infection and to regain partial access to markets.

Zoning may be applied to geographical areas, or to individual premises that are well isolated and quarantined.

A voluntary accreditation scheme could be established and producers encouraged to purchase replacement stock from SVD-free herds. It is unlikely that vaccination would be economically justified, due to the mildness of the clinical disease.

The OIE Code provides conditions for the importation of pigs and pigmeat from countries that are considered infected with SVD (see Appendix 3). These conditions require that pigs for shipment or slaughter came from free zones, that they were held in quarantine prior to shipment, were serologically negative after 28 days and that the animals were healthy at the time of shipment or slaughter. The requirements for meat products are less stringent, provided the products are heat processed to ensure the destruction of SDV virus.

APPENDIX 1 Guidelines for classifying declared areas

Infected premises (IP)

A premises classified as an IP will be a defined area (which may be all or part of a property) in which SVD is confirmed or presumed to exist. IPs will be subject to quarantine, served by notice, and eradication or control procedures.

Dangerous contact premises (DCP)

Premises classified as DCPs will be:

- all premises containing susceptible animals that have been in direct or indirect contact with an IP or infected animals;
- all premises sharing a common boundary with an IP where pigs have been kept during a period of 28 days before onset of disease on the IP;
- all premises to which pigs or equipment that have been in contact with infected pigs have been moved during a period of 28 days before the onset of clinical signs on the IP; and
- all premises on which pigs have been destroyed on suspicion of SVD.

DCPs will be subject to quarantine and eradication or control measures.

Suspect premises (SP)

Premises classified as SPs will be:

- all premises owned or managed in conjunction with an IP or a DCP;
- other premises within the RA on which pigs are kept;
- all premises with pigs from where the disease could have spread to the IP, during the period 28 days before to the onset of signs of SVD on the IP, whether by movement of animals (including wild pigs), people, vehicles, equipment or feedstuff; and
- all premises to which the disease could possibly have spread from an IP by way of movement of people, vehicles, equipment or feedstuff during the period back to 28 days before signs of SVD on the IP.

SPs will be subject to quarantine and intense surveillance.

Restricted area (RA)

An RA will be drawn around all IPs and DCPs, and include as many SPs as practical. The actual distance in any direction will be determined by the terrain and the distribution and movement of livestock and of domestic and wild pigs. The boundary of the RA should be at least 1 km from the boundary of any IPs or DCPs with at least two stock-proof barriers between the IP/DCP and the outer boundary of the RA. In areas where there are wild pigs, the RA should include an area substantially greater than the home range of any feral pigs on the IP or DCP so that feral pigs that may have come into contact with pigs or materials (eg effluent) from the IP or DCP stay within the RA. The boundaries must be modified as new information comes to hand. A high level of movement control and surveillance will apply.

Control area (CA)

A CA will be imposed around the RA to control movement of pigs, potentially contaminated vehicles and other fomites, for as long as is necessary to complete trace-back and epidemiological studies. The boundary of the CA should be at least 10 km from the boundary of the RA and there should be at least two stockproof barriers between the two. The CA must substantially exceed the home range of any susceptible feral animals that may enter the area. Less stringent movement control and surveillance will apply. Initially the CA may be a much larger area pending determination of the extent of the

outbreak. Once the limits of the spread of the disease have been confidently defined, the CA boundaries and movement restrictions should be relaxed or removed as appropriate.

APPENDIX 2 Recommended quarantine and movement controls

Infected and dangerous contact premises	**Suspect premises**
Movement out of pigs:	
Prohibited, except under permit for slaughter or disposal only (1).	Held on site for surveillance until quarantine lifted in 28 days (1).
Movement in of pigs:	
May be allowed under permit (2).	as for IP/DCP.
Movement out of pig carcases, meat, products, offal, wastes:	
Prohibited, except under permit for treatment or disposal (3).	May be allowed under permit (3) or after quarantine lifted.
Movement in and out of other animals, people, vehicles and equipment:	
Allowed under permit (4).	
Movement out of pig semen, embryos:	
Allowed under permit (5).	Allowed under permit (5) or after quarantine lifted.
Movement out of crops, grains:	
Allowed under permit (6).	Allowed under permit (6) or after quarantine lifted.

Restricted area	**Control area**
Movement out pigs:	
Prohibited.	Prohibited, except under permit into RA or to slaughter.
Movement in of pigs:	
Movement from a free area or CA to an abattoir is allowed under permit. Essential movement to a property may be permitted (2).	Movement to an abattoir or farm (2) is allowed under permit.
Movement within of pigs:	
Movement to an abattoir for immediate slaughter or to a farm (2) may be allowed under permit.	Movement to an abattoir or farm (2) is allowed under permit.
Movement through of pigs:	
Direct movement by road or rail may be allowed by permit, provided the origin and destination are outside the RA or CA and the stock are not unloaded en route.	
Movement of pig carcases, meat, products, offal, wastes:	
Movement into or within the RA is allowed under permit (3). Movement out of the RA is prohibited.	Movement into or within the CA is allowed. Movement out of the CA may be allowed under permit (3).
Movement out of semen, embryos:	
Allowed under permit (5).	No restrictions.
Risk enterprises:	
May continue to operate under permit.	As for RA

Restricted area (cont)	**Control area (cont)**
Sales, shows, etc: All concentrations of susceptible animals are prohibited.	As for RA.
Movement in and out of people: Allowed, subject to conditions (4).	Allowed.
Vehicles: Vehicles used to carry pigs and porcine materials must be decontaminated between loads under supervision.	Vehicles used to carry pigs and porcine materials must be decontaminated between loads.

Notes:

(1) Pigs on IPs and DCPs should preferably be slaughtered and disposed of on site. However, pigs may be moved within the same RA to an abattoir or knackery for immediate slaughter subject to the precautions listed in (3) below. Pigs on SPs should preferably be held on site and subjected to intense surveillance until quarantine is lifted (28 days), but may be moved to slaughter only as above.

(2) Permits for the movement of pigs onto an IP, DCP or SP, or into the RA or CA, should be issued with caution. Although such movements may pose no risk of spreading infection, compensation may be payable if these animals become infected. Stock must remain on the property for at least 28 days and be inspected before being moved again.

(3) Pig carcases, meats, products, offal and wastes from IPs, DCPs and SPs should preferably be disposed of on site, or, in the case of SPs, held on site until quarantine is lifted. However, porcine materials may be moved within the same RA for rendering or other approved disposal provided that:

- the material is not brought into direct or indirect contact with pigs;
- every precaution is taken to ensure that effluent or other fluids do not leak out of the transport vehicle;
- the transport vehicle is decontaminated under supervision between loads;
- before being released, the material is treated or processed in a manner that will destroy SVD virus or ensure that it will not be fed to pigs; and
- cross-contamination between treated/clean and infected material does not occur.

Porcine materials from other premises within the RA may be moved within but not out of the RA, subject to similar conditions. Movement of porcine materials within the CA should be allowed without restriction, and out of the CA under permit.

See the **Disposal Procedures Manual.**

(4) Movement of people, other animals, vehicles and equipment off IPs, DCPs and SPs should be restricted and subject to strict quarantine and disinfection procedures to prevent mechanical spread of SVD virus. Wherever possible, movement from IPs and DCPs should be delayed until after the completion of destruction, disposal, cleaning and first disinfection, and from SPs until after quarantine has been lifted (28 days). Cattle and sheep housed in direct contact with infected pigs should not be moved to other properties, but should either be moved to an abattoir for slaughter, destroyed on site, or monitored for serological or virological evidence of infection for up to 28 days, after which they may be retained on the property or moved elsewhere. Within the RA, people who regularly travel from farm to farm [Section 2.1.2] and come into contact with pigs must clean and disinfect hands, overgear, tools and vehicles between properties and keep detailed records of their movements. Within the CA, less stringent disinfection and record keeping may be required (see the **Decontamination Manual, Sections 4 and 5).**

(5) Semen and embryos collected from pigs on IPs and DCPs within 28 days preceding the first signs of SVD should be destroyed and disposed of on site. Genetic material handled at the same time and potentially cross-contaminated should also be destroyed. Material collected before this time may be removed after decontamination has been completed and the outside surfaces of containers, vials and straws have been disinfected. Other genetic material collected within the RA should be held and only released if the animals and premises of origin remain free of SVD for 28 days after collection. If any doubt exists, the material should be destroyed.

(6) Crops and grains grown on paddocks that have been sprayed with piggery effluent at any time during the 28 days preceding the likely onset of SVD on the property must be disposed of on site. Other crops may be removed from IPs and DCPs after the completion of decontamination, and from SPs after quarantine has been lifted (28 days). The crops must not be fed to or used as bedding or litter for pigs.

APPENDIX 3 OIE International Animal Health Code for Swine vesicular disease

[NB The following text is taken directly from the OIE International Animal Health Code (1992); Chapter 2.1.3. For definitions, Appendixes, etc see the original text. The OIE Codes are amended every year in May. There have been no amendments to the code for SVD in 1993, 1994 or 1995.]

Preamble: For diagnostic tests, reference should be made to the *Manual* (A3) [see OIE publications under References].

Article 2.1.3.1.

For the purposes of this *Code*, the *incubation period* for swine vesicular disease (SVD) shall be 28 days.

Article 2.1.3.2.

For the purposes of this *Code*:

SVD: *free country*

A country may be considered free from SVD when it has been shown that SVD has not been present for at least the past two years.

This period may be nine months for countries in which a *stamping-out policy* is practised.

SVD: *infected zone*

An SVD infected zone shall be considered as such until at least 60 days have elapsed after the last *case* has been reported and following the completion of a stamping-out policy and *disinfection* procedures, or 12 months after the clinical recovery or death of the last affected animal if a stamping-out policy is not practised.

Article 2.1.3.3.

Veterinary Administrations of SVD *free countries* may prohibit importation or transit through their territory, directly or indirectly, from countries considered infected with SVD of:

1) domestic and wild pigs;
2) *semen* of pigs;
3) *fresh meat* of domestic and wild pigs;
4) *meat products* of domestic and wild pigs which have not been processed to ensure the destruction of SVD virus;
5) *products of animal origin* (from pigs) *destined for use in animal feeding* or *for industrial use* which have not been processed to ensure the destruction of SVD virus;
6) *products of animal origin* (from pigs) *destined for pharmaceutical use* which have not been processed to ensure the destruction of SVD virus;
7) *pathological material* and *biological products* (from pigs) which have not been processed to ensure the destruction of SVD virus.

Article 2.1.3.4.

When importing from SVD *free countries, Veterinary Administrations* should require:

for domestic pigs

the presentation of an *international animal health certificate* attesting that the animals:

1) showed no clinical sign of SVD on the day of shipment;
2) were kept in a SVD free country since birth or for at least the past six weeks.

Article 2.1.3.5.

When importing from SVD *free countries, Veterinary Administrations* should require:

for wild pigs

the presentation of an *international animal health certificate* attesting that the animals:

1) showed no clinical sign of SVD on the day of shipment;
2) come from an SVD free country;

if the country of origin has a common border with a country considered infected with SVD:

3) were kept in a *quarantine station* for the six weeks prior to shipment.

Article 2.1.3.6.

When importing from countries considered infected with SVD, *Veterinary Administrations* should require:

for domestic pigs

the presentation of an *international animal health certificate* attesting that the animals:

1) showed no clinical sign of SVD on the day of shipment;
2) were kept since birth, or for the past six weeks, in an *establishment* where no *case* of SVD was officially reported during that period, and that the establishment of origin is not situated in an SVD *infected zone*;
3) were kept in a *quarantine station* for the 28 days prior to shipment and were subjected to the serum-neutralisation test for SVD with negative results.

Article 2.1.3.7.

When importing from countries infected with SVD, *Veterinary Administrations* should require:

for wild pigs

the presentation of an *international animal health certificate* attesting that the animals:

1) showed no clinical sign of SVD on the day of shipment;
2) were kept in a *quarantine station* for the 28 days prior to shipment and were subjected to the serum-neutralisation test for SVD with negative results.

Article 2.1.3.8.

When importing from SVD *free countries, Veterinary Administrations* should require:

for *semen* of pigs

the presentation of an *international animal health certificate* attesting that:

1) the donor animals showed no clinical sign of SVD on the day of collection;
2) the animals were kept in an SVD free country for not less than six weeks prior to collection;
3) the semen was collected, processed and stored strictly in accordance with Appendix 4.2.2.1.

Article 2.1.3.9.

When importing from countries considered infected with SVD, *Veterinary Administrations* should require:

for *semen* of pigs

the presentation of an *international animal health certificate* attesting that:

1) the donor animals showed no clinical sign of SVD on the day of collection and were subjected to the serum-neutralisation test for SVD with negative results;
2) the animals were kept in the *exporting country*, for the 28 days prior to collection, in an *establishment* or *AI centre* where no *case* of SVD was officially reported during that period, and that the establishment or AI centre is not situated in an SVD *infected zone*;
3) the semen was collected, processed and stored strictly in accordance with Appendix 4.2.2.1.

Article 2.1.3.10.

When importing from SVD *free countries, Veterinary Administrations* should require:

for *fresh meat* of pigs

the presentation of an *international sanitary certificate* attesting that the entire consignment of meat comes from *animals*:

1) which have been kept in an SVD free country since birth or for at least the past 28 days;
2) slaughtered in an *abattoir* and found to be healthy before and after slaughter.

Article 2.1.3.11.

When importing from countries considered infected with SVD, *Veterinary Administrations* should require:

for *fresh meat* of pigs

the presentation of an *international sanitary certificate* attesting that the entire consignment of meat comes from animals:

1) which have not been kept in an SVD *infected zone;*
2) slaughtered in an *abattoir* not situated in an SVD infected zone and found to be healthy before and after slaughter.

Article 2.1.3.12.

When importing from countries considered infected with SVD, *Veterinary Administrations* should require:

for *meat products* of pigs

the presentation of an *international sanitary certificate* attesting that the:

1) entire consignment of meat products comes from animals slaughtered in an *abattoir* and found to be healthy before and after slaughter;
2) meat products have been processed to ensure the destruction of SVD virus;
3) necessary precautions were taken after processing to avoid contact of the meat with any source of SVD virus.

Article 2.1.3.13.

When importing from SVD *free countries, Veterinary Administrations* should require:

for *products of animal origin* (from pigs) *destined for use in animal feeding* or *for industrial use*
the presentation of an *international sanitary certificate* attesting that these products come from animals which have been kept in an SVD free country since birth or for at least the past six weeks.

Article 2.1.3.14.

When importing from SVD *free countries, Veterinary Administrations* should require:

for *products of animal origin* (from pigs) *destined for pharmaceutical use*
the presentation of an *international sanitary certificate* attesting that these products come from animals:

1) which have been kept in an SVD free country since birth or for at least the past six weeks;
2) slaughtered in an *abattoir* and found to be healthy before and after slaughter.

Article 2.1.3.15.

When importing from countries considered infected with SVD, *Veterinary Administrations* should require:

for *products of animal origin* (from pigs) *destined for use in animal feeding* or *for industrial use*

meal and flour from blood, meat, defatted bones, hooves and claws

the presentation of an *international sanitary certificate* attesting that these products have been processed to ensure the destruction of SVD virus;

bristles

the presentation of an international sanitary certificate attesting that these products have been processed to ensure the destruction of SVD virus, in premises controlled and approved by the Veterinary Administration of the *exporting country;*

for fertilisers of animal origin

the presentation of an international sanitary certificate attesting that these products:

1) do not come from an SVD *infected zone*; or
2) have been processed to ensure the destruction of SVD virus.

Article 2.1.3.16.

When importing from countries considered infected with SVD, *Veterinary Administrations* should require:

for *products of animal origin* (from pigs) *destined for pharmaceutical use*
the presentation of an *international sanitary certificate* attesting that these products:

1) have been processed to ensure the destruction of SVD virus;
2) come from animals which have not been kept in an SVD *infected zone;*
3) come from animals slaughtered in an *abattoir* and found to be healthy before and after slaughter.

APPENDIX 4 Procedures for surveillance and proof of freedom

Proof of freedom

The OIE Code (Article 2.1.3.2; see Appendix 3;) states a country may be considered free from SVD when it has been shown that SVD has not been present for at least the past two years OR a period of nine months for countries in which a *stamping-out policy* is practised.

An SVD-infected zone must be considered as such until at least 60 days have elapsed after the last case has been reported and following the completion of a stamping-out policy and disinfection procedures, or 12 months after the clinical recovery or death of the last affected animal if a stamping-out policy is not practised.

Procedures for surveillance

In determining an effective but efficient program to prove freedom after an outbreak the following elements should be considered.

1) The livestock within the restricted, control and free areas should, if possible, be defined into discrete populations for the purposes of surveillance.
2) The number of properties detected as infected during the outbreak, and the degree of spread this indicates.
3) The estimated time the virus could have been present in the country.
4) The movement of livestock as recorded on Animal Health Emergency Management Information System (ANEMIS) during the outbreak. Surveillance planning needs to take into account the OIE-designated period of 28 days for the incubation period of swine vesicular disease.
5) The accuracy, cost and availability of laboratory tests to examine a large number of animals.
6) Whether vaccine has been used (this is very unlikely, see Section 2.2.9).
7) The resources available to undertake surveillance testing. Close cooperation between the epidemiologist and resources manager is essential. However, limited resources should not compromise achieving a scientifically acceptable result. For example savings may be accomplished by :
   - collecting material from abattoirs, even though material can only be selected from specific age groups of pigs.
   - organising the program over a slightly longer period.

All these factors will influence the statistically-acceptable sample size of testing required for Australia to claim freedom from disease. Clearly the pattern and timing of testing will depend on the specific circumstances, but should aim at extending the free area. A country must demonstrate that an effective surveillance program has been implemented and there has been no clinical, epidemiological or other evidence of swine vesicular disease during the nine months after a stamping-out policy has been implemented (see Appendix 3).

GLOSSARY

ANEMIS	*A*nimal Health *E*mergency *I*nformation *S*ystem. A system for the collection, assimilation, actioning and dissemination of essential disease control information using paper documentation and a computer database..
Animal by-products	Products of animal origin destined for industrial use, eg raw hides and skins, fur, wool, hair, feathers, hooves, bones, fertiliser.
Animal products	Meat products and products of animal origin (eg eggs, milk) for human consumption or for use in animal feeding.
AUSVETPLAN	A series of documents that describe the Australian response to exotic animal diseases, linking policy, strategies, implementation, coordination and emergency-management plans.
Complement fixation	Assay for complement by its ability to cause lysis of red blood cells. Fixation of complement by combination of antibody and antigen which reduces its ability to lyse red blood cells.
Consultative Committee on Exotic Animal Diseases	A committee of State/Territory CVOs, AAHL and CSIRO, chaired by the CVO of Australia (Cwlth DPIE), to consult in emergencies due to the introduction of an exotic disease of livestock, or serious epizootics of Australian origin.
Control area	A declared area in which defined conditions apply to the movement into, out of, and within, of specified animals or things. Conditions applying in a control area are of lesser intensity than those in a restricted area (*see* Appendix 1).
Coronary band	Band around the top of the hoof.
Dangerous contact animal	An animal showing no clinical signs of disease but which, by reason of its probable exposure to disease, will be subjected to disease control measures.
Dangerous contact premises	Premises containing dangerous contact animals (*see* Appendix 1).
Declared area	A defined tract of land for the time being subject to disease control restrictions under exotic disease legislation. Types of declared areas include *restricted area; control area; infected premises;* and *dangerous contact premises.*
Decontamination	Includes all stages of cleaning and disinfection.
ELISA	Enzyme-linked immunosorbent assay — 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.
Fomites	Inanimate objects (eg boots, clothing, equipment, vehicles, crates, packagings) that can carry the exotic agent and spread the disease through mechanical transmission.

Incubation period	The time that elapses between the introduction of the pathogen into the animal and the occurrence of the first clinical signs of the disease.
Immunofluorescence	Technique for the location of antibodies or antigens on cells by binding of a fluorescently-tagged antibody or antigen and examination by fluorescence microscopy.
Infected premises	*see* Appendix 1.
Local disease control centre	An emergency operations centre responsible for the command and control of field operations in a defined area.
Movement controls	Restrictions placed on movement of animals, people and things to prevent dissemination of disease.
Porcine material	Includes pig carcases, meat, products, offal and wastes.
Premises	A defined area or structure, which may include part or all of a farm, enterprise or other private or public land, building or property.
Prevalence	The number of cases of a specific disease (or infection or positive antibody titre) occurring in a given population at a particular time (expressed as the proportion of sampled animals with the condition of interest at a given time).
Quarantine	Legal restrictions imposed on a place, animal, vehicle or other things limiting movement.
Rendering (of carcases)	Processing by heat to inactivate infective agents. Rendered material may be used in various products according to particular disease circumstances.
Restricted area	A declared area in which defined rigorous conditions apply to the movement into, out of, and within, of specified animals, persons or things (*see* Appendix 1).
Risk enterprise	A livestock or livestock-related enterprise with a high potential for disease spread, eg an abattoir, milk factory, artificial breeding centre or livestock market.
Salvage	Recovery of some (but not full) market value by treatment and use of products, according to disease circumstances.
Sentinel animals	Animals of known health status monitored for the purpose of detecting the presence of a specific exotic disease agent.
Serosurveillance	Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.
Serotype	A subgroup of a genus of microorganisms identifiable by the antigens carried by the members.
Serum neutralisation	A type of serological test designed to detect and measure the presence of antibody in a sample. The test is based on the ability of an antibody to neutralise the biological activity of an antigen.
Spell	Keep unused for a period of time until there is no risk of disease agent remaining.

Stamping out	Eradication procedures based on quarantine and slaughter of all infected animals and animals exposed to infection.
State/Territory disease control headquarters	The emergency operations centre that directs the disease control operations to be undertaken in the State/Territory.
Surveillance	A systematic program of inspection and examination of animals or things to determine the presence or absence of an exotic disease.
Susceptible species	Animals that can be infected with the disease (for SVD — pigs).
Suspect animals	An animal that may have been exposed to an exotic disease such that its quarantine and intensive surveillance is warranted; OR an animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises	Premises containing suspect animals (*see* Appendix 1).
Swill	Food scraps of placental mammal origin that have not been obtained from approved slaughter facilities or treated by an approved process.
Swill feeding	Swill feeding is the feeding of swill to pigs; unlicensed swill feeding is illegal in Australia.
Tracing	The process of locating animals, persons or things that may be implicated in the spread of disease, so that appropriate action be taken.
Vaccines	
— attenuated	A vaccine prepared from infective or 'live' microbes that have lost their virulence but have retained their ability to induce protective immunity.
— inactivated	A vaccine prepared from a virus that has been inactivated ('killed') by chemical or physical treatment.
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A *biological* vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A *mechanical* vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.
Vesicular disease	Any disease in which intact, ruptured or healing blisters, papules or ulcers may be evident on skin or mucosal surfaces.
Viraemia	The presence of viruses in the blood.
Zoning	Dividing a country into defined infected and disease free areas. A high level of movement control between zones will apply.

Abbreviations

AAHL	CSIRO Australian Animal Health Laboratory, Geelong
AI	Artificial insemination
ANEMIS	Animal health emergency information system
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
CA	Control area
CCEAD	Consultative Committee for Exotic Animal Diseases
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	Chief veterinary officer
DCP	Dangerous contact premises
DPIE	Department of Primary Industries and Energy
ELISA	Enzyme-linked immunosorbent assay
FMD	Foot-and-mouth disease
IP	Infected premises
OIE	World Organisation for Animal Health [Office International des Epizooties]
RA	Restricted area
SP	Suspect premises
SVD	Swine vesicular disease
VE	Vesicular exanthema
VS	Vesicular stomatitis

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Video/training resources

A pig's tale — why swill feeding is banned (video), AAHL 1993 (available from the Foreign Diseases Unit, DPIE, Canberra; or AAHL).

Foot-and-mouth disease and other vesicular diseases (72 slides), available from the Animal Diseases/Incidents Section, DPIE, Canberra.

[See the **Summary Document** for a full list of training resources.]

OIE publications

OIE Code (1992). *International Animal Health Code* (6th edition), OIE, Paris, France.

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