

Biosecurity – Porcine brucellosis in domestic pigs

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Management of the biosecurity risk

Porcine brucellosis is a disease caused by the bacterium *Brucella suis* (*B. suis*) in pigs. The disease is common in many parts of the world and *B. suis* can infect a wide range of animals as well as humans.

The purpose of this procedure is to set out how suspected or confirmed *B. suis* incidents in domestic pigs in New South Wales (NSW) should be managed.

The aim in managing these cases is to minimise risks to human health (work health and safety as well as food safety), animal health and livestock industries.

Scope

The *Biosecurity Act 2015* (the Act) promotes biosecurity as a shared responsibility between government, industry and the community. This procedure is a State Priority for NSW and applies to the NSW Department of Primary Industries (NSW DPI), an office within the Department of Regional NSW, and Local Land Services (LLS).

Managing the risk of porcine brucellosis is a priority activity under the NSW DPI/LLS policy, '[Endemic](#)'. This procedure has been jointly developed by NSW DPI and LLS and is based on an assessment of the risks associated with porcine brucellosis.

Biosecurity legislation summary

B. suis is listed in [Schedule one, Part one of the Biosecurity Regulation 2017](#), which lists the pests and diseases of animals which require notification. Any person that suspects or knows a pig is infected with *B. suis* has a duty to notify an authorised officer as defined in the Act. Owners and people handling pigs suspected or known to be infected with *B. suis* have a general biosecurity duty to prevent, eliminate or minimise the risk of spread of *B. suis*.

The collection, use and disclosure of information in accordance with this procedure, including any internal or external discussion or distribution of information, must be in compliance with the [Privacy and Personal Information Protection Act 1998](#) or be exempt by the operation of section 387 of the Act.

Section 387 (2) of the Act provides authority for the disclosure of information about a person, without the consent of the person: to a public sector agency or to any other person, but only if the disclosure is reasonably necessary for the purpose of exercising a biosecurity risk function.

Work health and safety

The main risk posed by *B. suis* infection in pigs is spread of infection from pigs to humans that could lead to serious chronic disease in people and fatalities.

The [Work Health and Safety Act 2011](#) places an obligation on the agency (NSW DPI and LLS), as a person conducting a business or undertaking, and workers to provide a safe and healthy workplace. Safe Work Method Statements that support activities included in this procedure must be used in identifying, assessing, and controlling risks.

NSW DPI and LLS will work together to create a safe and supportive work environment when undertaking any activities for this procedure.

Farm visit related work health and safety

These activities may require personnel to operate in an environment and/or location that are unfamiliar and sometimes isolated (by time and space) which may pose a higher level of risk to their health, safety and wellbeing than normal work environments. Situations may be affected by different environmental and other hazards which must be identified and suitably addressed.

Field staff must undertake a [pre-ops site inspection](#) guide before undertaking any field operations.

Inspection and sample collection, or other activities that involve animals may on occasions involve significant safety issues. Under no circumstances should the health or welfare of animals or people be compromised while undertaking these activities. Personnel handling animals must follow recommended safety policies and procedures.

Assistance by expert animal handlers may be necessary to complete some tasks. Animals being handled (especially for invasive procedures) must be adequately restrained to minimise the risk of injury. Handling including examination or sampling should not be undertaken unless the risk of personal contamination/injury can be adequately managed.

Travel to and from the site by motor vehicle may be hazardous e.g. driving at dawn or dusk, rising flood water, mud or gravel roads. Refer to the [Safe Work Method Statement \(SWMS\) - Driving Vehicles](#) that identifies specific hazards and treatments.

Personnel must be monitored regularly and systematically to ensure their health, safety and well-being is not adversely affected. Action must be taken if adverse effects of the field activities are identified.

Operational plans must be undertaken for the task including identifying and addressing risks. Field activity plans/risk assessments must account for (as a minimum) fatigue, working environment (hot, cold), task(s) being conducted, locality, isolation, communication access, medical plan information, team size and experience of personnel.

Personnel must be trained to perform the task and/or be supervised by an experienced person.

Personnel may be required to interact with people suffering trauma as a result of a diagnosis of Brucellosis in their stock. These people may be stressed, tired, irritable and irrational. Refer to Welfare Services where appropriate.

Personnel must consider biosecurity when moving between properties. Refer to the following – [Property visits and Risk assessment – Maintaining biosecurity entering and exiting properties](#).

Zoonotic potential work health and safety

B. suis is a zoonotic disease and precautions must be taken to minimize the risk of spread of infection from pigs to veterinarians and accompanying persons. *B. suis* infection can lead to serious chronic disease in people and fatalities.

Staff conducting field work on properties that are potentially infected/ contaminated with *B. suis* must:

1. Be trained and assessed as competent in risk assessment, entry and exit procedures and the selection, use, storage and maintenance of personal protective equipment (PPE),
2. Identify, assess and control risks (by elimination or through minimisation) (see the '[Guide – Risk management for emergencies](#)' (which includes a link to a task risk assessment template).
3. Follow protocols in the:
 - a. [Procedure for Reporting Notifiable Pests and Diseases of Animals and biosecurity events](#)
 - b. [Procedure for Prohibited Matter Pests and Diseases of Animals – Investigation and Alert Phase](#)
 - c. [Guide – Personal decontamination](#).
 - d. Publication Biosecurity property visits (SWMS)
4. Promptly report to the local [Public Health Unit](#) and a supervisor any incidents, such as unprotected exposure to tissues, body fluids or discharges from *B. suis* cases,
5. Ensure that appropriate personal protective equipment (PPE) is used by all people who could potentially be exposed to *B. suis* through activities directed by this procedure.

BRUCELLA SUIIS MAY INFECT HUMANS AND MAY CAUSE FATALITIES. The [Infectious Disease Factsheet on Brucellosis](#), published by NSW Health, provides details on Brucellosis symptoms and risk in humans.

People handling carcasses, tissues or body fluids of animals known to be, or suspected of being, infected with *B. suis* should work in a manner that reduces the likelihood environmental contamination, including trying to avoid creating aerosols or dust.

While having contact with potentially contaminated matter, appropriate PPE must be used (gloves and protective clothing and footwear, eye and face protection and protect skin breaks from exposure to potential contamination ([NSW Health Brucellosis and feral pig hunting fact sheet](#)). Additional PPE can be used which could include safety glasses (protects from splashes) and respiratory protection (protects where possibility of inhalation exists) ([WHO 2006](#)). Despite potential occupational exposure, cases in NSW are rare and usually result from contact with feral pigs in north western NSW, or from consuming unpasteurized dairy products while overseas ([NSW Zoonoses Annual Report 2018](#)).

Medical advice should be sought if any of the following occur:

- A person feels unwell following handling live animals or carcasses known or suspected to be infected, or
- A person has had any exposure without appropriate PPE, or
- A person has had exposure to infection through wounds.

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Porcine brucellosis in domestic pigs - procedure

1 Background information

Brucella suis (*B.suis*) is listed as a notifiable disease in [Schedule 1 of the NSW Biosecurity Regulation 2017](#). The disease agent is considered endemic in feral pigs in NSW and is not listed as prohibited matter.

The main biosecurity risk posed by *Brucella suis* (*B. suis*) infection in pigs and the rationale behind implementing a herd eradication program is the zoonotic disease risk for people working with pigs or consuming pig products, which could lead to human health issues such as chronic disease and fatalities. *B. suis* infection in pigs also has the potential to spread to other domestic species and this could impact on trade for these industries in Australia.

The most likely method of entry of *B. suis* infection into a domestic pig herd is through direct or indirect contact with feral pigs. Infection is generally transmitted to pigs after ingestion of contaminated reproductive material – usually birth and/or abortion products and uterine discharges. Infection can also spread through natural mating or artificial insemination with infected semen.

B. suis can circulate in the bloodstream of infected pigs for up to 90 days. Some pigs recover from infection, whilst others remain permanently infected. Boars which develop infections of the reproductive tract seldom recover.

2 Reporting and notifying porcine brucellosis

Any person who suspects or knows a pig is infected with *B. suis* has a duty to notify an authorised officer as defined in the Act. Owners and people handling pigs suspected or known to be infected with *B. suis* have a biosecurity duty to prevent, eliminate or minimise the risk of spread of *B. suis*.

Notifications of suspected *B. suis* infection must be reported and assessed as per the Procedure Biosecurity [Reporting notifiable pests and diseases of animals and biosecurity events](#). Refer to section 3. Reporting notifiable diseases that are not prohibited matter.

3 Technical information

Technical information about porcine brucellosis including clinical signs, transmission and diagnosis can be found at [NSW DPI Primefact Brucellosis \(Brucella suis\) in pigs](#)

4 Roles and responsibilities

NSW Department of Primary Industries (Animal Biosecurity)

- Provide access to technical resources for staff and producers via the NSW DPI Brucellosis (*Brucella suis*) in Pigs webpage and Regional NSW intranet
- Develop supporting documentation to assist delivery of the procedure
- Provide technical support to LLS staff investigating suspect cases or managing cases of *B.suis* in pigs.

Local Land Services

- Ensure authorised officers and other field staff are trained and resourced to undertake activities under the procedure
- Investigate reports of suspect *B. suis* cases in pigs or high-risk traces.
- Manage cases of *B. suis* in pigs including issuing legal instruments and assisting in development of Herd management and eradication plans and sampling pigs where required.

5 Investigation of suspect porcine brucellosis cases

Reports of suspect symptoms in pigs should be investigated to confirm or exclude *B. suis* infection. NSW DPI will fund notifiable disease testing to confirm or exclude infection in a herd that is not currently recorded as infected. This includes where a new infection is suspected on a property that has previously successfully completed a *B. suis* Herd management and eradication plan and had been released from the Biosecurity Direction (see section 8).

Field investigations may be conducted by LLS authorised officers under the Act, such as an LLS veterinarian, a biosecurity officer under the supervision of an LLS veterinarian or alternatively, a private veterinarian under the supervision of an LLS veterinarian. An LLS veterinarian who is supervising an investigation by a biosecurity officer, or a private veterinarian, must ensure that the case is managed in accordance with the standards required by this procedure.

6 Diagnosis

Porcine brucellosis is often suspected based on the clinical history of reproductive failure (abortions, returns-to-service after mating and the birth of weak or stillborn piglets) or symptoms relating to disease of reproductive organs (such as vaginal discharge in breeding pigs and orchitis in boars). Pigs may also become lame with swollen joints and/or develop signs of incoordination and hind leg paralysis. Laboratory testing is required for further evidence or confirmation of infection.

6.1 Diagnostic laboratory testing

If the investigator suspects porcine brucellosis, laboratory testing is required to provide further evidence or confirmation of a diagnosis. The below information relates to testing undertaken when a new case of *B. suis* is suspected. See section 8 for information about testing as part of a herd management and eradication plan. See Appendix 1 for guidance on interpretation of results.

6.1.1 Serological testing

Rose Bengal Rapid Plate Test (RBRPT) and the Complement Fixation Test (CFT)

There is no direct serological test available for *B. suis*. However, *Brucella abortus* is exotic to Australia and antigen from this bacterium can be used to detect *B. suis* exposure in animals. The RBRPT and the CFT are considered to be the appropriate screening tests for use in pigs.

ELISA

A *Brucella* spp. cELISA is also available for confirmatory testing of inconclusive pigs following consultation with the laboratory. Use of the ELISA to resolve inconclusive results is summarised in Appendix 2: Resolution of an inconclusive *B. suis* reactor in a *B. suis* eradication program.

6.1.2 Bacterial culture

B. suis infection can be confirmed by bacterial culture from fresh tissues or fluids e.g. reproductive organs, foetal tissues and membranes, lymph nodes and semen.

6.1.3 PCR

Whilst *Brucella* culture is considered the gold standard test for confirmation of clinical disease caused by *B. suis* infection, PCR can be a useful tool for *B. suis* detection where culture has resulted in the overgrowth of contaminating organisms. PCR is recommended when fresh tissues or fetuses are available for testing. As results from a culture have several days turnaround time, it is recommended PCR is requested in conjunction with culture.

6.2 Specimens to collect

Specimens required for laboratory testing include:

- Serum samples (**not whole blood**) submitted chilled for serology (RBRPT and CFT). It is important that the serum is spun off promptly with porcine samples. Haemolysed samples are not suitable for either RBRPT or CFT (although can be used in the cELISA). Gel clot separator tubes (yellow top) can be used to collect blood if serum cannot be separated.

Note – as an alternative, red top containers with fresh blood can be placed upright and allowed to clot and contract and then serum (if not haemolysed) drawn off without spinning.

- Fresh tissues or fluid submitted chilled for bacterial culture and PCR
- Aborted fetuses submitted whole for bacterial culture and PCR

6.3 Packaging and submission of samples

Specimens should be sent to the NSW DPI Laboratory Services, Elizabeth Macarthur Agricultural Institute, Woodbridge Road, Menangle NSW 2568.

Information on packaging of specimens is available in the [NSW DPI \(Laboratory Services\) customer services](#). Specimens must be accompanied by a completed [Veterinary Specimen Advice Form](#).

6.4 Notification of laboratory results:

Reporting of laboratory results will be in accordance with the procedure Biosecurity [Reporting notifiable pests and diseases of animals and biosecurity events](#).

7 Initial management of an infected property:

A property may be classified as an Infected Premises (IP) by the NSW Chief Veterinary Officer (CVO), when there is reasonable suspicion or confirmation that a herd or pig is infected with *B. suis*. A recommendation to the CVO will generally be made by the NSW DPI Pig Biosecurity Coordinator or NSW DPI Team Leader Prevention, Preparedness, Response and Recovery (PPRR).

When premises are classified as an IP, the following activities are required:

7.1 Issue a Verbal Individual Biosecurity Direction (IBD):

The LLS authorised officer managing the case, in consultation with NSW DPI Pig Biosecurity Coordinator:

- Determines the conditions required for the IP based on the enterprise type, laboratory test results and the risks associated with the IP.
- Issues a verbal IBD to the owner/manager of the IPs as soon as practicable. The Authorised Officer is to make contemporaneous notes and obtain particulars sufficient to prepare and serve a notice in writing within 7 days following the verbal IBD (see [Biosecurity Directions Procedure](#))

If there is a concern about potential non-compliance, a written IBD should be issued immediately.

7.2 Draft and issue a written Individual Biosecurity Direction:

- The LLS authorised officer managing the case coordinates the drafting of a written IBD. A template for an IBD ([IBD1: *B. suis* confirmation in domestic pigs](#)) is available at (INT21/85035) and should be modified as required for the case.
- The draft IBD must first be circulated internally for review and approval to the NSW DPI Pig Biosecurity Coordinator, NSW DPI Team Leader PPRR or Deputy CVO (DCVO).

- An authorised officer serves a written copy of the IBD within seven days of the issuing of the verbal IBD and must maintain copies of all IBDs given.
- The requirements within the IBD must be clearly articulated to, and understood by, the person to whom it is issued, or through an interpreter if required.
- Contact details of the LLS authorised officer should be supplied to the owner/manager for on-going advice when the IBD is issued.

(Instruction on giving and writing biosecurity directions, or accepting biosecurity undertakings is outlined in the [Biosecurity Directions Procedure](#))

The individual biosecurity direction will be developed to manage risks of the individual IP, but in general must:

- a) Prohibit movements of any pigs, pig products, pig carcasses or pig waste onto or from the property
- b) Specify the animal products, equipment, fittings and vehicles which the biosecurity direction applies.
- c) Require taking all necessary measures to prevent any pigs straying from or onto the affected property.
- d) Address movement controls, such as the requirement of a movement permit to move pigs, pig products, pig carcasses, pig waste or other potentially infectious material, if agreed to and issued by an authorised officer.
- e) Limit entry to the production area or contact with pigs or pig waste, to persons undertaking essential tasks for the welfare of the pigs, authorised officers under the Act, or persons under the direct control and supervision of an authorised officer.
- f) Require the property owner to develop and implement a disease management/ eradication plan for *B. suis* on the property. The plan must be approved by an authorised officer.

7.3 Advice to owner/manager of stock

An authorised officer, who is also an LLS veterinarian, should give both verbal and written advice including:

- Information about the disease in pigs [NSW DPI Primefact Brucellosis \(Brucella suis\) in pigs](#)
- Human health risks – the officer should refer people to [NSW Health](#) or a human medical practitioner. NSW Health [Brucellosis factsheet](#) contains useful information.
- Epidemiology of the disease – the implications for other animals, products such as meat.
- Control measures – including movement controls, tracing, disposal, decontamination (as outlined in the IBD).

The authorised officer must document this advice in LHMS as soon as practicable.

7.4 Movement permits

7.4.1 Permits for live pigs

While the property is under an IBD, live pigs will be prohibited from moving from the property. An authorised officer may only issue a permit for live pigs to move from the property to an abattoir in exceptional cases where the NSW CVO and the CEO NSW Food Authority have endorsed a herd management plan that allows test and removal of pigs (see section 8.2.3)

7.4.2 Permits for pig carcasses and other waste

Pig carcasses or pig waste may be permitted to move to a designated site for bio-secure disposal in accordance with the conditions of a permit issued by an authorised officer.

7.5 Tracing stock and animal products

The LLS authorised officer investigating the property should use the [ANIMAL BIOSECURITY- PIG FIELD INVESTIGATION QUESTIONNAIRE](#) (INT20/44898) to assist with obtaining history and tracing information, and must:

- Trace all pigs and pig products that have moved to, or from, infected premises in the period 60 days prior to the likely index case until movement controls were implemented,
- Liaise with NSW DPI to assess trace information for risk of porcine brucellosis infection. NSW DPI will provide state coordination of *B. suis* incidents.
- Consider movement of other livestock (and species other than pigs) that may be significant to the infected premises (e.g. dogs).

8 Resolving infected property status

Resolution of the infected property status requires approval by the NSW CVO. This status change will be recommended to the CVO following:

- Confirmation by an LLS authorised officer that all measures in the IBD have been completed, and
- There has been successful completion of a herd management and eradication plan for porcine brucellosis which is confirmed by an LLS authorised officer.

8.1 Funding of testing during a herd eradication program

Funding of testing to determine the status of individual pigs will be the responsibility of the owner of the pig herd.

8.2 Herd management and eradication plan

The property owner/manager will be required to implement a Herd management and eradication plan. The property will remain under an IBD during implementation of the plan. The Herd management and eradication plan must comply with requirements of this procedure and must be approved by an authorised officer. A template for the development of a Herd management and eradication plan ("[Brucella suis Management and Eradication Plan – Destocking](#)") is available at INT21/85038.

(Note: The Herd management and eradication plan will generally involve destocking. In exceptional cases, with approval of the NSW CVO and the CEO NSW Food Authority, options to test and remove pigs may be considered - see 8.2.3 for details.)

Potentially the quickest approach to eradicate *B. suis* from a pig herd is to destock, removing the entire pig herd from the property. This process involves destocking, including humane euthanasia and bio-secure disposal, without further testing.

Any herd management and eradication plan should also incorporate measures to mitigate risks posed by other livestock (and species other than pigs) that may pose a risk to ongoing infection or re-infection at the premises (e.g. dogs).

Following destocking of the entire herd and after completing any disposal of pigs and pig waste, the owner should implement any necessary decontamination measures for their property, prior to restocking, early during the rest period as described below.

Further requirements for management will then depend on the plans and timing regarding restocking of the property. The requirements will depend on the option of:

- Restocking in less than 12 months after destocking, or
- Not restocking within 12 months after destocking.

Details for each option are described below.

8.2.1 Restocking in less than 12 months after destocking

An additional period of resting the property with no pigs, following destocking, is required prior to restocking within 12 months. *B. suis* has variable survival and persistence characteristics which are greatly affected by temperature and/or UV exposure. As such, the period of rest, following removal of the last pig from the property will vary depending on husbandry and environmental conditions. It will generally be between 30 – 120 days, as approved by the NSW CVO.

A recommendation for a rest period will be made to the NSW CVO by the NSW DPI Pig Biosecurity Coordinator taking into account agent persistence for *B. suis* regarding temperature, season and location. A document which summarises available persistence information ("[Persistence of Brucella spp.](#)") is available at INT20/177618 for reference.

The property is eligible to be restocked with pigs within 12 months of destocking following completion of the required rest period and compliance with the IBD as confirmed by the LLS authorised officer managing the case.

If the property is confirmed to be eligible for restocking, the existing IBD will be revoked and a new IBD issued. A template to assist development of the new IBD ([IBD2: B. suis confirmation in domestic pigs](#)) is available at (INT21/85035) and should be modified as required for the case.

For the new IBD:

- movement restrictions will be removed,
- other directions that need to be carried over from the initial IBD or required for the property should also be included.
- The new IBD will be issued for a six-month period from the proposed date of restocking and will require further implementation of the Herd management eradication plan. As per the "Brucella suis Management and Eradication Plan – Destocking" the owner will be required to:
 - Monitor stock and report to an authorised officer within 24 hours (or if on a weekend during the next weekday work hours) any reproductive failures or clinical signs consistent with *B. suis*.
 - Communicate by phone or email with the authorised officer managing the case on a monthly basis to confirm the health status of the pigs
 - Maintain reproductive records as well as records of test results and fate of pigs
 - Complete a single herd test with negative test results for all restocked pigs tested, undertaken between 30-60 days after restocking. The number of pigs that need to be tested will be depend on the restocked herd size and will be approved by an authorized officer (see section 8.2.1.1 for herd testing guidelines).

The property will still be classified as an IP while under this new IBD.

Note: When varying or revoking an existing direction the Authorised Officer must issue the person with written advice to inform the person of the variation or revocation on the approved 'Letter of Advice or Variation of a Biosecurity Direction'.

The IBD may be released at the end of six months providing:

- The conditions of the IBD have been met, and
- All testing of pigs following restocking (as per 8.2.1.1) is negative (this may involve resolution of pigs with inconclusive results), and
- Any investigation of signs potentially relating to potential *B. suis* infection has been resolved as negative (this may involve resolution of pigs with inconclusive results).

If the herd is suspected to be infected during the six-months following restocking, a full veterinary investigation must be undertaken as per Sections 5 and 6. If the herd is confirmed to be infected, it must again be managed as per sections 7.

8.2.1.1 Herd testing guidelines following restocking

- Completion of a single herd test with negative test results is to be undertaken between 30-60 days after restocking.
- Herd testing of pigs as part of a herd management and eradication plan is to be undertaken using both the RBRPT and CFT tests in parallel.
- Samples to be collected for serology are described in section 6.2 of this procedure.
- Sample submission to the State Veterinary Diagnostic Laboratory is described in section 6.3 of this procedure.
- A process to manage serological reactors and inconclusive results is described in the decision tree at Appendix 2.

Which pigs to test?

For herd testing – grower class and above, both sexes. Note, all pigs which are tested must be individually identified prior to or at time of sample collection.

Sample size for herd testing

The following table gives minimum numbers to test (sample size) for the given herd size (N).

For a round of herd testing, pigs are randomly selected. If the herd (including grower class and above) is spread over a number of sheds, calculate the number of pigs to be tested in each shed using the proportion of the total herd (including grower class and above) in each shed and then randomly select them from within those sheds.

Table 1. Herd testing numbers and confidence of testing with prevalence of 5% and test sensitivity of 87%

Herd size (N)	Test 1 sample size 99% conf*
5	5*
10	10*
15	15*
20	20*
30	30
40	40
50	46
100	70
200	85
300	92
500	97

1000	102
2000	104
5000	105
10000	106

Calculations used from the document “[some important formulae for freedom analysis](https://epitools.ausvet.com.au/onestagefreedom)” on the Epitools website: <https://epitools.ausvet.com.au/onestagefreedom>.⁷

Assumptions/ definitions and background information:

- Note the sensitivities in the table above are calculated using the RBRPT only. The actual sensitivity (by including the CFT) will be higher than this.
- Tests to be performed are the RBRPT (with a reported sensitivity of 87%) and the CFT (with a reported sensitivity of 55%). Both have specificity > 99% (EFSA meta-analysis). RBRPT and CFT tests used in parallel have sensitivity of 94 – 94.5%.
- *The SeP for individual RBRPT tests (test 1) when N<40 is approximately 87%.
- Prevalence in testing program of an infected property is assumed to be 5%.
- Incubation period: Reported to be variable, as early as 17 days for abortions to occur after mating with infected boars.

8.2.2 Property not restocked within 12 months after destocking.

- If the owner elects to keep the property destocked for 12 months, the property will remain under the initial IBD with movement restrictions (as per section 7.2: IBD1: *B.suis* confirmation in domestic pigs).
- The owner still needs to complete requirements for this option as per the “Brucella suis Management and Eradication Plan – Destocking”.
- The property may be released without any further requirements, after the 12-month period has been completed pending confirmation by an LLS authorised officer that:
 - all measures in the IBD have been completed, and
 - there has been successful completion of a herd management and eradication plan.

8.2.3 Herd management and eradication (exceptional case consideration)

The zoonotic risks associated with the handling and processing of pigs from an IP (and subsequent requirements to plan and safely implement this operation) mean it will not be feasible in most circumstances to process pigs from an IP at an abattoir.

In exceptional cases, the NSW CVO and the CEO NSW Food Authority may consider (on a case by case basis) an application for a Herd management and eradication plan that allows for the testing and removal of pigs from a herd for abattoir processing. This option will require the development of a Herd management and eradication plan that includes:

- A work plan from the intended abattoir that is approved by the NSW Food Authority, and
- A herd testing and management approach to determine and isolate negative pigs for processing including management of inconclusive results.

(Should a test and remove strategy be considered, preliminary laboratory testing and epidemiological information will need to be available for further consideration and validation to assess the risk of the proposed test and remove strategy.)

9 Definitions and acronyms

Authorised officer	This may include LLS Biosecurity Officers, LLS Team Leaders, LLS District Vets, NSW DPI Veterinary Officers, NSW DPI Regulatory Inspector
CFT	Complement Fixation Test
CVO	NSW DPI Chief Veterinary Officer
DCVO	NSW DPI Deputy Chief Veterinary Officer
Domestic pig	Any porcine that is kept or farmed (other than a feral pig)
NSW DPI	NSW Department of Primary Industries
Herd	A group of animals that is maintained as a separate and discrete unit, in terms of physical contact with other susceptible species, by an appropriate fence or barrier.
Infected herd	A herd in which: <ul style="list-style-type: none">• an infected pig is present or• where an infected pig was present and the herd has not completed measures to become resolved or• infected animal introduced or• a veterinarian has reasonable suspicion that a pig infected with <i>B. suis</i> is or was present and the premises has not completed measures to become resolved as per section 6.
Infected pig	A pig that is confirmed positive with culture for <i>B. suis</i> or is PCR positive for <i>B. suis</i> .
IP	Infected Property. A defined area (which may be all or part of a property) on which an infected herd or infected pig was present, or the NSW Chief Veterinary Officer has reasonable suspicion that a herd or pig infected with <i>B. suis</i> is or was present and the premises has not completed measures to become resolved.
LHMS	Livestock Health Management System
LLS	NSW Local Land Services
PPE	Personal Protective Equipment
RBT	Rose Bengal Test
RP	Resolved Premise. A premise that was an infected premise, that has successfully completed a herd management and eradication plan as per section 8.
Suspect herd	Where there is epidemiological evidence to suspect the presence of <i>B. suis</i> infection, such as where: <ul style="list-style-type: none">• there is evidence of contact with an infected herd or animals, or• inconclusive serological pigs have been detected but have not been investigated, or• a herd contains animals with clinical signs consistent with <i>B. suis</i> that remain unresolved, or• a herd where an infected animal has been introduced and there has been potential for transmission of infection.
Suspect pig	A pig that has: <ul style="list-style-type: none">• clinical signs consistent with a diagnosis of <i>B. suis</i>, which haven't been investigated• gross postmortem lesions consistent with <i>B. suis</i>• reacted to a screening test but has not been subject to a follow-up testing.
Species Coordinator	The NSW DPI authorised officer designated as the species coordinator. For details see the intranet .

10 Documentation

[NSW DPI Primefact Brucellosis \(Brucella suis\) in pigs Form - Biosecurity direction](#)

[Form – Biosecurity Permit](#)

[Policy - Collection, use and disclosure of information](#)

[Procedure - Collection, use and disclosure of information](#)

[Procedure - Biosecurity directions](#)

[Procedure - Biosecurity undertakings](#)

[Procedure - Biosecurity permits](#)

[Procedure - Biosecurity Reporting notifiable pests and diseases of animals and biosecurity events.](#)

[IBD1: *B. suis* confirmation in domestic pigs](#)

[IBD2: *B. suis* confirmation in domestic pigs](#)

[Brucella suis Management and Eradication Plan – Destocking](#)

[Guidelines - Persistence of Brucella spp.](#)

11 Records

All events, including all advice to owners or managers of pigs, must be entered into LHMS, see the [LHMS field guide](#) for details.

Records relating to properties placed under biosecurity restrictions are maintained indefinitely in LHMS. Hand written records must be retained as per [Intranet Record Management guidelines](#).

12 Revision history

Version	Date issued	Notes	By
1.0	17/12/2021	New procedure developed.	Animal Biosecurity

13 Contact

General Enquires

1800 680 244

animal.biosecurity@dpi.nsw.gov.au

Appendix 1: *Brucella suis* result interpretation table

	RBRPT titre Range from Negative to 1+(low), 2+ and 3+ (high) positive	CFT titre <4 Negative 4 Inconclusive ≥ 8 Positive	ELISA	PCR	Culture	Interpretation (speak with pathologist at lab or Pig Biosecurity Coordinator if require advice)
Initial Diagnosis testing	Negative (0)	<4				Seronegative. If strong clinical suspicion, resubmit convalescent samples in 2-4 weeks for follow up testing or submit culture/PCR samples sooner if possible. Can also request ELISA test on original sample, especially if haemolysed.
	1+, 2+ or 3+	Any				If has clinical signs consistent with <i>B. suis</i> infection, then positive regardless of CFT results
	1+	<4, 4 or anti-complementary				Inconclusive if no clinical signs. Resubmit convalescent samples in 2-4 weeks for follow up testing. Can also request ELISA test on original sample, especially if haemolysed.
	2+ or 3+	Any				Seropositive, regardless of presence or absence of consistent clinical signs
	1+, 2+ or 3+	≥8				Seropositive, regardless of presence or absence of consistent clinical signs
			<30			Negative
			≥30			Positive
				Positive		Positive
				Negative		Negative
					Positive	Positive
					Negative	Negative □
Eradication Plan Testing	Negative	<4				Seronegative
	1+	<4, 4 or anti-complementary				Inconclusive, see Appendix 2 for guidance on resolution). Can also request ELISA test on original sample, especially if haemolysed.

					Interpretation (speak with
2+ or 3+	Any				Seropositive, regardless of presence or absence of consistent clinical signs
1+, 2+ or 3+	≥8				Seropositive, regardless of presence or absence of consistent clinical signs

- It is possible to have a seropositive but culture negative animal. They would be considered positive for *B suis* infection.

Please note:

- Quality of serum (haemolysis) can impact results of both RBRPT and CFT. The laboratory may elect to use an ELISA test if serum is haemolysed.
- Negative serology may not completely exclude Brucellosis infection, especially from a single sample. As part of an investigation, if acute clinical signs are consistent with Brucellosis, resubmit a convalescent sample in 2-4 weeks for follow up testing.

Appendix 2: Resolution of an inconclusive *Brucella suis* reactor

