Swine Disease Emergency Response Plan Reference Manual for Producers

Developed by the:
Pork Nova Scotia Emergency Response Planning Committee

Agri-Futures
Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada
Nova Scotia's ACAAF Council
Advancing Canadian Agriculture and Agri-Food
Canada

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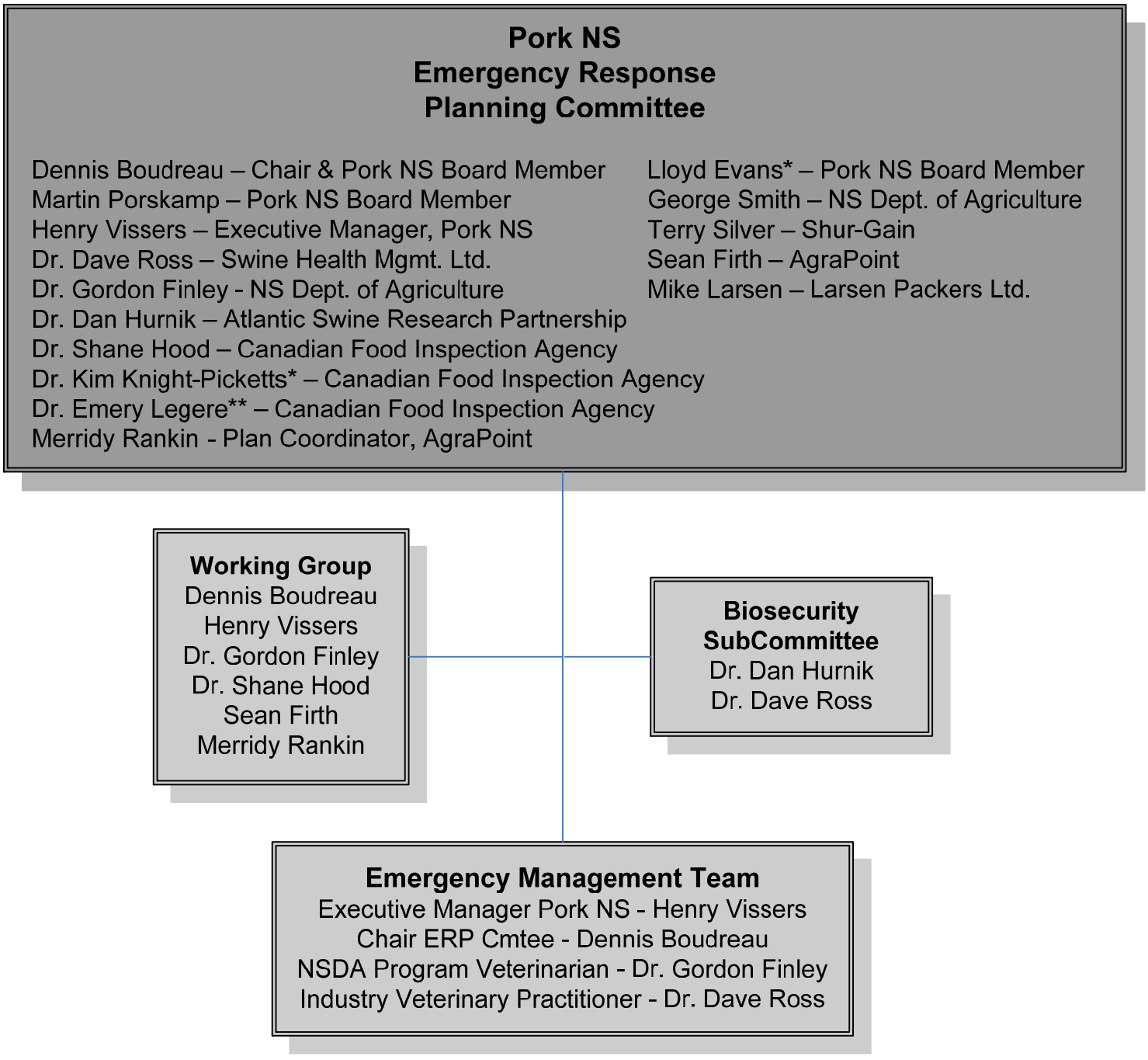
Acknowledgements

The Pork NS Emergency Response Planning Committee wishes to acknowledge the contributions of the Committee Members, the companies and government departments and agencies they represent.



*Left Committee in April 2007
** Joined Committee in April 2007

Sponsorship

Pork NS wishes to acknowledge the financial sponsorship of the following companies:

Acronyms

The following acronyms are used throughout the Emergency Response Plan and associated documents.

ASRP	Atlantic Swine Research Partnership
CFIA	Canadian Food Inspection Agency
CPC	Canadian Pork Council
EMT	Emergency Management Team
ERP	Emergency Response Plan
FAD	Foreign Animal Disease
FADES	Foreign Animal Disease Emergency Support Plan
HACCP	Hazard Analysis Critical Control Points
JEOC	Joint Emergency Operations Centre
NSDA	Nova Scotia Department of Agriculture
PSC	Public Safety Canada
CQA®	Canadian Quality Assurance®
REOC	Regional Emergency Operations Center (CFIA)

Swine Disease
Emergency Response Plan

Developed by:
Pork Nova Scotia Emergency
Response Planning Committee

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Introduction

The Nova Scotia (NS) agricultural industry is a major contributor to the provincial economy. Pork producers are a significant part of that contribution. A swine health emergency in the NS pork industry such as an outbreak of a Foreign Animal Disease (FAD) would have serious and long lasting impacts on the pork industry. It also has the potential to negatively impact other agricultural commodities, wildlife, tourism and exports resulting in major losses across the province.

The potential emergencies facing pork producers range from a FAD outbreak to natural disasters affecting a single farm or the whole industry. The actions taken to prevent the emergency and the actions taken during the emergency are vital to the long term success of the industry. The Canadian Food Inspection Agency (CFIA) is the lead agency for dealing with a FAD animal health emergency. The NS Department of Agriculture (NSDA) supports the CFIA in a FAD outbreak. A partnership between the pork producers, Pork NS, the NS Department of Agriculture (NSDA), the Canadian Food Inspection Agency (CFIA), pork industry stakeholders and the Canadian Pork Council (CPC) is the key to the success of this group in the development of the ERP and in a coordinated emergency response.

The NS pork industry and it's various partners have developed the following Swine Disease Emergency Response Plan (ERP) focusing on Emergency **Prevention, Preparedness, Response** and **Recovery.** The Pork ERP follows the recommendations of Pork NS, the CFIA, the NSDA, private veterinarians, the Atlantic Swine Research Partnership (ASRP) and the Canadian Pork Council's (CPC) Canadian Quality Assurance Program®(CQA®).

A **Reference Manual** has been developed for use by pork producers and industry stakeholders. The Reference Manual contains documents to support the recommendations made in the ERP.

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Emergency Response Plan

Purpose

The purpose of the Pork NS Swine Disease Emergency Response Plan (ERP) is to manage the NS pork industry's response to a Foreign Animal Disease (FAD) or other disease threats. This Plan has been developed by the Pork NS Emergency Response Planning Committee. This ERP documents the activities and actions of the pork producers and pork industry stakeholders in their preparations for an emergency, during the emergency and post emergency.

Authority

Under the authority of Pork NS, this ERP and associated Communication Plans have been developed to provide the industry with guidelines for due diligence in disease control. The key to the successful identification and containment of a disease threat is through partnership and full cooperation among the NS pork industry, the NSDA, CFIA and pork industry stakeholders.

Scope

The Pork NS Emergency Response Planning Committee's Emergency Management Team (EMT) will work cooperatively with the responsible federal and provincial agencies and departments during an animal health emergency by providing technical advice and accurate industry information as needed to return the NS pork industry to pre-emergency operational levels. The EMT will also keep the producers informed of the status of the disease or emergency. The ERP will also help guide the industry and the EMT during the **'gray period'** – the period of time between the suspicion and confirmation of a FAD when the CFIA becomes the lead agency. **The actions taken during this gray period can prove vital to the containment of a disease**.

Objectives

The specific objectives of the Pork NS Swine Disease ERP are to provide the pork industry with a comprehensive emergency response plan covering the activities and actions to be taken:

1. to provide guidelines for an effective response in an emergency situation
2. for the **prevention** of an emergency
3. to be **prepared** if an emergency happens
4. to **respond** in a timely and effective way
5. to hasten the **recovery** period following the emergency

The four pillars or phases of emergency management planning are:

1. **Prevention**
2. **Preparedness**
3. **Response**
4. **Recovery**

1. Prevention

Prevention of an emergency includes the ongoing activities taken in advance to reduce the chance of an emergency occurring and the effects of the emergency when one occurs. Actions taken in advance of an emergency can help to reduce or eliminate the damage done by an emergency.

Preventative activities include:

- producer and industry stakeholder education and implementation of farm biosecurity principles
- producer and industry stakeholder education of FAD and other disease threats
- the development of a Reference Manual for pork producers

The biosecurity principals for isolation, traffic control and sanitation must be applied to:

- movement of equipment on and off the farm
- delivery of goods and services
- movement of personnel on and off the farm
- transportation of animals on and off the farm
- daily on farm requirements for disease control

Farm biosecurity refers to the proactive measures taken to keep diseases out of animal populations where they do not already exist and prevent the spread of disease to other animals. The three key principles of biosecurity are **isolation, traffic control** and **sanitation**. **Refer to Appendix 1 of the Reference Manual.**

Isolation refers to the confinement of animals within a controlled environment that excludes vectors or carriers of disease (i.e. rodents, flies, birds, dogs, cats, wild animals). A barn keeps the animals in, but it also keeps other animals out. Transmission of viruses and bacteria by anything that can walk, crawl, fly or be carried from farm to farm should be presumed. The proximity of other animal facilities and prevailing winds must be considered when determining the location of new facilities.

Traffic control includes the movement of people and vehicles onto the farm, the traffic patterns within the farm and the traffic leaving the farm. The spread of disease follows the movement of people, animals and traffic.

Sanitation addresses the disinfection of materials, people and equipment entering the farm and the cleanliness of the personnel working on the farm. The specifics of cleaning and disinfecting any facility will depend on many factors unique to that farm. There are general guidelines that can be used when developing farm specific cleaning and disinfection protocols. In all situations, it is highly recommended that your veterinarian be consulted to help develop and implement any plans. The CPC's CQA® Program Producer Manual contains information regarding sanitation in pork facilities. **Refer to Tab 5 of the Reference Manual.**

2. Preparedness

Preparing for an emergency involves the development of activities and programs that are used to support prevention, response and recovery. These are usually ongoing activities or programs developed in advance to reduce the chance of an emergency occurring and the effects of the emergency when one occurs.

Preparedness activities include:

Activity	Primary Responsibility	Secondary Responsibility
A. The development of a **Site Plan.** Refer to Tab 6 of the Reference Manual.	Producers are strongly encouraged to complete Tab 6 of the Reference Manual	Pork NS
B. The development of a National **Traceability Program** which includes a premise identification.	Federal & Provincial Governments & National Commodity Organizations	Pork NS
C. The **identification** of industry threats, hazards and risks. Refer to Tab 7 of the Reference Manual.	Pork NS ERP Committee	
D. Ongoing producer and industry stakeholder **education** (i.e. ERP, FAD, biosecurity). Refer to the ERP and Tabs 4 to 13 of the Reference Manual.	Pork NS & NSDA	
E. The ongoing implementation of the CPC's **CQA® Program** standards.	Pork NS	
F. The development and maintenance of an **Emergency Response Plan.**	Pork NS ERP Committee	Pork NS

A. Site Plan

All pork producers are strongly encouraged to complete a Site Plan (a template is in **Tab 6 of the Reference Manual**). The site plan includes the premise location, the main and secondary property entrances and exits, the farm water source and the location and distance to neighboring/adjacent farm buildings. This information will be needed by the CFIA in the event of a FAD outbreak on a farm. Producers can save significant time during the early stages of an outbreak by having this form completed and one copy made.

B. As of June 2006, a **National Traceability Program** is being designed "to provide rapid access to accurate, up to date traceability information. This information may be used to assist in managing emergencies resulting from a food safety issue, a natural disaster or an infectious disease". This new approach to agri-food identification and traceability is based on premise identification, animal identification and animal movement. Premise identification will include a legal land description, the contact and/or owner name, premise type and the commodity kept, disposed of or grown on the premise and will apply to auctions, processors, renderers and assembly yards. Individual animals will be identified. The program proposes tracking individual and group animal movement to abattoirs, rendering facilities, assembly yards, community pastures and farm to farm movement.

C. The **identification** of industry threats, hazards and risks is an important part of the ERP. Producers should periodically evaluate their barns and the movement of people, equipment and animals on and off the farm for biosecurity risks. Once risks are identified, producers can then take steps to eliminate or at least reduce the risks. Further information can be found in **Tab 7 of the Reference Manual**.

D. Education

It is crucial for pork producers, their employees, service personnel and pork industry stakeholders to understand the benefits of having a well developed ERP as well as their role and responsibilities in the ERP. The Pork NS Swine Disease ERP has been developed to reduce the length of a FAD emergency by identification of the roles and responsibilities during the 'gray period'. It also covers non FAD disease threats to the NS pork industry.

The benefits of a well developed and practiced ERP include:

- definition of the responsibilities of those involved in the emergency allowing for faster response time
- the identification of acceptable animal care practices during an emergency
- reduction of the industry recovery time and cost of the emergency
- showing the public the pork industry is pro-active
- helping the CFIA keep the trade borders open
- minimizing the financial impact of the emergency
- helping keep the NS pork industry viable

The Pork NS Swine Disease ERP will be distributed to the Pork NS ERP Committee Members, NS pork producers, the Canadian Pork Council and will be made available from Pork NS upon request.

Educational presentations and/or sessions will be developed and delivered to educate all NS pork producers and their employees, feed companies and the service sector not only *about* the Pork Emergency Response Plan, but *their role and responsibilities* in the event of an emergency. It is important to keep these groups up to date on the ERP to ensure full understanding and cooperation if/when the ERP is activated.

Pork Producers
Presentations on the ERP will be given to the pork producers during their Pork NS Zone Meetings. Yearly updates on the ERP will be given during the Pork NS Annual General Meeting. It is the responsibility of the Pork NS Executive Manager to ensure the delivery of these presentations.

Service Sector
The pork industry service sector includes veterinarians, hog transporters, feed company representatives and drivers, processors, rendering companies and dead stock pick up services. These groups will be kept informed of the ERP through information bulletins or fact sheets.

Pork NS and practicing swine health veterinarians play a key role in the ongoing educational aspect of the Pork NS ERP – the role of the ERP, the role of the pork producers and the industry service personnel and the technical aspects addressed in the Reference Manual.

Processing Plants
Letters from the Pork NS ERP Committee Chair have been sent to the federally and provincially inspected processing plants regarding the pork industry ERP and their role in protection of the pork industry. The letter requested the Plants send copies of their emergency response plans to the Committee.

Website
Information on the Pork NS Swine Disease ERP will be added as a section to the Pork NS website. This will serve to keep the pork industry, industry stakeholders and the general public up to date on the ERP and resource materials that are developed. In the event of an emergency, daily updates on the situation will be posted on the site. It is the responsibility of Pork NS to develop and maintain this section of their website.

An “Industry Log In” section on the website will allow producers and industry stakeholders to access information that should not be made available to the general public. In the event of an emergency, easily accessible but confidential information on the emergency would be available for producers supporting the concept of restricted travel during an animal health emergency and allowing for maximum distribution of information and 24 hour access to information.

Measurements of Success in Educating Producers and Stakeholders
To measure how successful the Pork ERP Committee has been at educating producers *about* the ERP, Agri-Futures will send questionnaires to all pork producers in 2008.

To measure how successful the Pork ERP Committee has been at educating people *about their role and responsibilities* in the event of an emergency, the Committee will use a combination of questionnaires, table top exercises and live simulations.

E. The **CPC's CQA® program** is the production component in the Canadian pork industry's commitment to consumers that their pork meets the highest food safety standards. The CQA® program is based on an internationally accepted food safety system called HACCP (Hazard Analysis Critical Control Point). HACCP programs take a preventative approach where potential hazards are identified and steps are taken to eliminate or minimize the hazard with documentation of the procedures. The ongoing adherence to the CQA® program standards is therefore an essential part of every pork producers approach to work. The CQA® program was developed for the CPC by a team of specialists. The program is supported and accredited by the CFIA.

F. The development and ongoing maintenance of a swine disease **emergency response plan** for the NS pork industry is a key component to emergency preparedness. This ERP, together with the Producer's Reference Manual provides the pork industry with the information needed to be prepared for and respond to an animal health emergency should one occur.

3. Response

The objective during the response phase is to end the emergency with minimum loss or damage and to assist in the recovery with high standards for animal welfare issues. The response to an emergency includes actions with short and long term effects and therefore the Response Actions must be carefully planned in advance of the emergency.

During the Response Phase of an emergency, the EMT will meet in person or by conference call and decide if the ERP Operational Plan should be activated. Accurate and timely communications with producers, stakeholders and the general public and assisting the CFIA during a FAD outbreak are two key response actions.

ERP Activation Triggers

The EMT will activate the ERP in response to:

1. Suspicion of a FAD in NS
2. Confirmation of a FAD in NS
3. Confirmation of a non FAD disease in NS that poses a threat to the industry
4. On suspicion or confirmation of a FAD or non FAD outside NS

Notification of Alert Levels

Notification from Pork NS to Producers and Stakeholders

Producers and stakeholders will receive notification of disease threats from Pork NS. The level of Alert will depend on the level of risk to the industry and will be decided on a case by case basis by the EMT. Producers and stakeholders are an integral part of the response to a suspected or confirmed disease threat. Notification of an Alert Level from Pork NS to producers and industry stakeholders must result in immediate action as outlined in the Alert Level.

There are three Alert Levels – Green, Yellow and Red.

Green Alert

The first level of Alert is the Green Alert.

During a Green Alert

1. all pork producers must verify their CQA® Program biosecurity measures are being followed
2. all industry stakeholders must verify their biosecurity measures are in place and effective
3. the industry must remain vigilant and keep abreast of the situation for any further developments or increased risks
4. all operations and business should proceed as normal but with caution

Phone calls to follow up on the Green Alert will be at the discretion of the EMT.

Pork NS EMT will decide if the Green Alert will be ended or upgraded to a Yellow Alert.

Yellow Alert

The second level of Alert is the Yellow Alert. A Yellow Alert is declared on the suspicion of a FAD in NS. The geographical area of the Yellow Alert will be province wide or a portion thereof.

The effectiveness of the Yellow Alert depends on the total cooperation of the industry. A lack of cooperation may well put the industry at risk.

During a Yellow Alert, producers and industry stakeholders must increase their level of biosecurity by implementing additional biosecurity measures such as:

1. locking farm gates or securing farm entry
2. cancelling all non-essential work on the farm and restricting access to immediate farm family and essential farm employees only
3. **following the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period**
4. implementing a 'by appointment only' delivery system for farm essentials (such as feed delivery, emergency repairs)
5. making arrangements to clean and disinfect vehicles entering and exiting the farm
6. verifying the Premise Log Book is complete
7. read Chapter 3 *Biosecurity Measures for Swine Production Facilities* of the Biosecurity Information document found in your Emergency Response Plan Manual

Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 5 of the Reference Manual for further information.

Pork NS EMT will decide if the Yellow Alert will be ended or upgraded to a Red Alert.

A positive test result for a FAD will immediately move the Alert Level to a Red Alert.

Red Alert

The Red Alert is the highest level of Alert. A Red Alert is declared by the EMT after the CFIA declares an emergency based on the definitive diagnosis of the presence of a FAD. The EMT's STOP movement advisory must be maintained unless directed otherwise by the CFIA. The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine.

The CFIA is the lead agency in dealing with a FAD. The Pork NS EMT will work closely with the CFIA to provide industry advice and technical expertise.

Producer and Employee Emotional Support
Emotional support may be required for persons involved in the mass depopulation of pigs, and for the owners of swine herds suffering high losses or requiring mass depopulation. Under the FADES agreement, the "NS Department of Agriculture is responsible for providing support to the CFIA in a FAD emergency response. NSDA may …. pro-actively identify other areas of concern (i.e animal welfare, emergency feed, welfare slaughter, stress/financial counseling) and facilitate implementation of appropriate services" (taken from the FADES document).

Currently, the NSDA provides stress and financial counseling through the NS Farm Health and Safety Committee. This Committee has developed and funds a Farm Family Support Center answered by an individual with an educational background in psychology, counseling and crisis management. After contact has been made, an assessment is done to ascertain what kind of help is the most appropriate for the situation. The confidential, toll free number is 1-877-418-7555.

4. Recovery

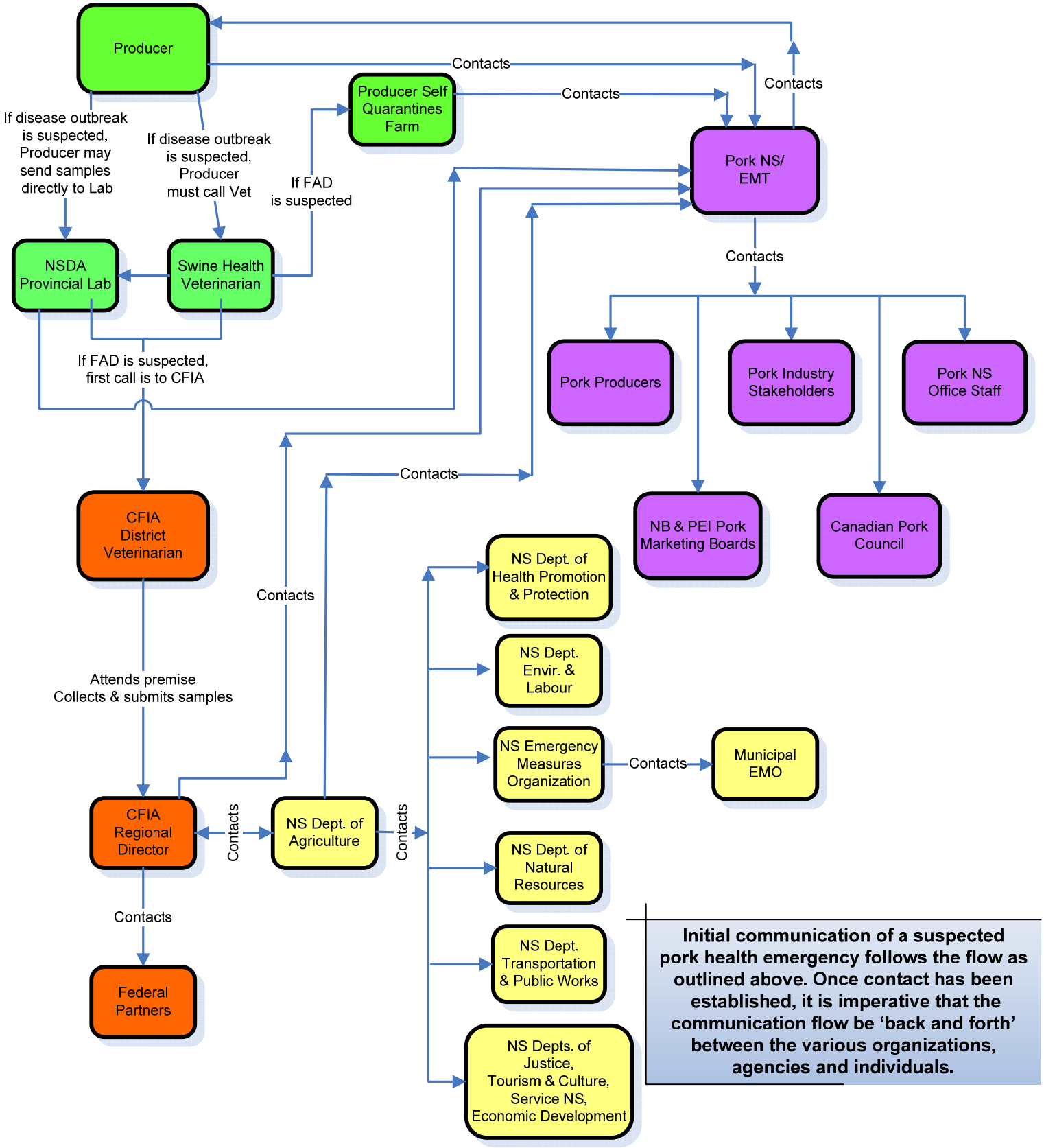
The period immediately following the end of the emergency is the Recovery Period. The actions taken during this period are focused on restoring the situation to normal or near normal. Issues to consider are repopulation of production facilities, financial considerations, reestablishing public trust and consumer confidence and review of risk reduction measures.

It is important for producers and industry stakeholders to periodically reevaluate their biosecurity procedures to assess their level of risk. Over time, weaknesses in current biosecurity practices will be identified and new guidelines will be developed for reducing biosecurity risks on farms.

Pork NS will work collaboratively with the NSDA and the CFIA to reestablish public trust and consumer confidence.

The Recovery Period may last an extended period of time.

Appendix 1 Initial Communications Flow Chart for a FAD



Initial communication of a suspected pork health emergency follows the flow as outlined above. Once contact has been established, it is imperative that the communication flow be 'back and forth' between the various organizations, agencies and individuals.

Appendix 2 Emergency Management Team

The Emergency Management Team (EMT) for the Pork NS Emergency Response Planning Committee is comprised of the following:

- the Chair of the Pork NS ERP
- the Executive Manager of Pork NS
- the NS Department of Agriculture Program Veterinarian
- a Veterinarian specializing in swine health, i.e. Dr. Dave Ross, Swine Health Management Ltd. or Dr. Dan Hurnik, ASRP

Pork NS Emergency Management Team

Position	Name	Office Phone
Pork NS Executive Manager	Henry Vissers	902-895-0581
Pork NS ERP Committee Chair	Dennis Boudreau	902-769-3501
NSDA Program Veterinarian	Dr. Gordon Finley	902-893-6540
Industry Veterinarian	Dr. Dave Ross	902-538-3273

GREEN ALERT

To All Producers and Industry Stakeholders:

The Pork NS Emergency Management Team has issued a **GREEN ALERT** due to the following: (*disease*) is (*suspected or confirmed)* in *(species)* in (*location*). Refer to the Biosecurity Document, Tab 4 of your Reference Manual for information on the disease (*please see attached for more information on the disease).*

All Producers must:

- Verify all CQA® Program biosecurity measures are being followed.
- Proceed with caution for all daily operations.
- Remain vigilant and keep abreast of the situation for any further developments.
- Read Chapter 3 *Biosecurity Measures for Swine Production Facilities* of the Biosecurity Information document found in your Emergency Response Plan Reference Manual.

Industry Stakeholders must:

- Verify all company biosecurity measures are in place and effective.
- Proceed with caution for all daily operations.
- Remain vigilant and keep abreast of the situation for any further developments or increased risks.
- Technical Service Personnel read, Chapter 4 *Biosecurity Measures for Technical Service Personnel* of the Biosecurity Information document found in your Emergency Response Plan Reference Manual.
- Feed Companies and Livestock Transporters read Chapter 5 *Biosecurity Measures for Feed Companies, Livestock Transporters and Deadstock Collectors* of the Biosecurity Information document found in your Emergency Response Plan Reference Manual.

Refer all media inquires to Pork NS at 902-895-0581.

Confirm your receipt of this **GREEN ALERT** immediately by return email or calling Pork NS at 902-895-0581.

Henry Vissers

Executive Manager, Pork NS

YELLOW ALERT

To All Producers and Industry Stakeholders:

The Pork NS EMT has declared an industry wide **YELLOW ALERT.** The Canadian Food Inspection Agency (CFIA) suspects (*disease name*) which is a Foreign Animal Disease (FAD). This disease is currently in (*location/Province*). Refer to the Biosecurity Document, Tab 4 of your Reference Manual for information on the disease. The effectiveness of the Yellow Alert depends on the total cooperation of the industry. A lack of cooperation may well put the industry at risk.

All Producers must:

- Lock farm gates or secure farm entry points.
- Cancel all non essential work on the farm and restrict access to immediate farm family and essential farm employees only.
- Implement a 'by appointment only' delivery system for farm essentials (such as feed delivery).
- Make arrangements to clean and disinfect all vehicles entering and exiting the farm. Refer to Fact Sheet *Cleaning & Disinfection of Vehicles during a Yellow Alert.*
- **Follow the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**
- Verify Premise Log Book is complete.
- Read Chapter 3 *Biosecurity Measures for Swine Production Facilities* of the Biosecurity Information document found in your Emergency Response Plan Reference Manual.

All Stakeholders must:

- **Follow the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**
- Make only essential deliveries to pork farms using an "appointment only" system.
- Make arrangements to clean and disinfect vehicles after visiting every farm. Refer to Fact Sheet *Cleaning & Disinfection of Vehicles during a Yellow Alert.*
- Technical Service Personnel read Chapter 4 *Biosecurity Measures for Technical Service Personnel* of the Biosecurity Information document found in your Emergency Response Plan Reference Manual.
- Feed Companies and Livestock Transporters read Chapter 5 *Biosecurity Measures for Feed Companies, Livestock Transporters and Deadstock Collectors* of the Biosecurity Information document found in your Emergency Response Plan Reference Manual.

Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 5 of the Reference Manual for further information.

Refer all media inquires to Pork NS at 902-895-0581.

Confirm your receipt of this YELLOW ALERT immediately by return email or by calling Pork NS at 902-895-0581.

Henry Vissers

Executive Manager, Pork NS

RED ALERT

To All Producers and Industry Stakeholders:

The Pork NS EMT has declared an industry wide **RED ALERT.**

The Canadian Food Inspection Agency (CFIA) has received positive confirmation of (*disease name*) which is a Foreign Animal Disease (FAD). This disease is currently in (*location/province*). Refer to the Biosecurity Document, Tab 4 of your Reference Manual for information on the disease.

The Canadian Food Inspection Agency is the lead agency for control and eradication of a FAD. Pork NS is working with CFIA and NS Department of Agriculture on behalf of the pork industry.

Producers must have CFIA approval for any livestock movement or deadstock removal.

The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine. For more information call the CFIA at (*phone number*).

The **Farm Family Support Center** offers a confidential counseling service to NS Farm Families and employees experiencing stress. Their toll free telephone number is **1-877-418-7555**.

Confirm your receipt of this RED ALERT immediately by return email or by calling Pork NS at 902-895-0581.

Henry Vissers

Executive Manager
Pork NS

Biosecurity

(See the Biosecurity, Purchasing and Barn Sanitation sections of the Producer Manual.)

Biosecurity refers to the measures you take to reduce the risk of spreading disease from one area to another. It is important to recognize there are external and internal measures to be taken. External measures are designed to keep pigs, birds, rodents and humans from introducing disease-carrying organisms into the herd. Internal measures are designed to keep disease from being carried from one area to another within your operation.

26. Do you have a written protocol that describes entry of:

a) People?
Yes ○ No ○

b) Animals?
Yes ○ No ○

c) Equipment?
Yes ○ No ○

All three of these things can introduce pathogens into your barn that may be of concern from a food safety perspective. They may also transfer other disease causing organisms that could have a negative impact on your herd.

27. Are boots used in the barn ever used outside the barn as well?

Yes ○ No ○

Boots are a primary method of transfer of organisms from one place to another. When you wear your boots outside of the barn as well as inside, you risk picking up microorganisms that may be deposited in your pig barn. Keep this in mind even if you never wear your boots off the farm. Who has come into the yard? Do you have other livestock commodities that may be carriers of organisms that are not found in your pig barn? The Barn Sanitation and Biosecurity sections of the Producer Manual discuss this issue further.

28a) Describe your rodent control program.

As with your barn sanitation program, be as specific as possible in your answer to this question. Identify the chemicals you use for bait, the types of traps that you use, where they are situated, how often the bait needs to be changed, how frequently you check traps, etc. Consider keeping a record of the removal of dead rodents, but bear in mind that if you use baits, the animals are probably dying somewhere other than the bait station.

28b) Is your rodent control program effective?

Yes ○ No ○

29. Are dogs or cats allowed in the production unit?

Yes ○ No ○

Dogs and cats can be important vectors for microorganisms. Both can carry *Salmonella.* Cats are well known hosts to *Toxoplasma,* especially nursing mothers and kittens. If you allow cats in your barn, try to keep them out of the production area, cover feed carts and bins, provide litter pans and have all cats neutered. The best course of action, of course, is to keep cats and dogs out of the barn altogether.

30. Excluding outbreak situations, where it may be impractical, are severely ill, injured or dead pigs quickly removed and kept separate from other pigs?

Yes ○ No ○

Sick and injured animals will shed infectious organisms. If possible, remove them to a sick pen. Remove dead animals as soon after death as possible, to minimize transmission of microorganisms to other animals in the pen.

31. Do people who work in your barn wash and disinfect their hands and boots after handling sick or dead animals?

Yes ○ No ○

It is important for your staff to wash their hands and boots after handling sick or dead animals, to minimize the risk of transmission of microorganisms to other animals. You might also consider the use of disposable gloves when handling sick and dead animals.

SURVIVAL OF KEY SWINE PATHOGENS

Agent	Potential Route of Entry[1]	Survival in Environment [2]
Mycoplasma Hyopneumoniae	carrier pig aerosol < 3.2 km	7 days in organic matter (11 days refrigerated)
Actinobacillus Pleuropneumoniae	carrier pig fomite	few days in organic matter
Bordetella Bronchoseptica	carrier pigs, dogs, cats, rodents (less pathogenic)	
Pasteurella Multocida	carrier pigs, humans, cattle, rabbits, dogs cats, rats, poultry, goats sheep (some strains may be non-pathogenic) fomites, aerosols	8 days in water 6 days in liquid manure 49 days in nasal washes
Hemophilus parasuis	carrier pigs	Short
Streptococcus suis	carrier pig, sheep, goats, horses, cattle, fomites	25 days @ 9 ^{o}C 100 days @ 0 ^{o}C
Salmonella sp	carrier pigs (choleraesuis),carrier animals animal protein products, fomites, water	years in manure, 115 days water 120 days in soil
Brachyspora Hyodysenteriae	carrier pigs, rodents, pets fomites	61 days @ 5 ^{o}C 7 days @ 25 ^{o}C
brachyspiraa pilosicoli	carrier pigs, humans, dogs, birds	
Lawsonia intracellularis	carrier pigs, feces, potentially rodents	2 – 3 weeks in manure
E coli	Carrier pigs, animals fomites,	11 weeks in manure
PRRSV	Carrier pigs, semen, water, fomites, aerosol	3 weeks in organic matter 11 days in water
PRV	carrier pigs, dogs, raccoons, rodents aerosol, flies, water fomites	18 days on steel, manure 2 days, urine 14 days, well water 7 days, flies 7 days
TGE/PRCV	carrier pigs, dogs, cats, foxes, flies, birds fomites	low in summer, stable when frozen
Influenza	carrier pigs, birds, humans aerosols	24 - 48 hours
Ascaris suum	carrier pigs, fomites	years

[1] Transmission may not in all cases have been proven.
[2] Survival of agent is gradual and length of survival is dependent on degree of initial contamination, protection by organic matter and exposure to drying and sunlight.

Swine Disease
Emergency Response Plan
Biosecurity Information

Developed by:
Pork Nova Scotia Emergency
Response Planning Committee

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Chapter 1 GENERAL PRINCIPLES OF BIOSECURITY

General Biosecurity principles depend on the type of disease that is of concern.There are 3 main disease issues:

1. ENDEMIC DISEASE (Diseases normally present in a region)	Present in region/country i.e. Mycoplasma, PRRS, Circovirus	Normal commercial status, generally unregulated
2. FOREIGN ANIMAL DISEASE (Diseases not present in a country)	A disease with trade implications (Foot and Mouth Disease, Hog Cholera)	Agricultural crisis subject to: **Health of Animals Regulations**
3. **FOREIGN ZOONOSIS** (A new condition that can also cause disease in humans)	A reportable disease that is contagious to people such as H5N1 (Asian) Avian Influenza	Society wide crisis subject to: **Health of Animals + Public Health Regulations**

There are 3 areas of biosecurity concern around which protocols are built:

1. INSIDE: inside of building is where the infections occur.

2. PERIPHERY: outside periphery of buildings from where contamination can be accidentally introduced inside to animals.

3. PUBLIC: public areas and other farms where contamination can originate from.

BIOSECURITY PRINCIPLES

ENDEMIC DISEASE: each farm can create a protocol specific to its circumstances	
INSIDE	INFECTIOUS DISEASE HAS TO ENTER FROM OUTSIDE BUILDING, THUS THE OVERALL GOAL IS TO PREVENT DISEASE ENTRY INTO BARNS ▪ Only bring in animals or animal products (semen) of known health status that will not introduce new disease. ▪ If practical, place animals into a quarantine to verify health status prior to placement into main herd. ▪ Use separate inside clothing and boots only (assume periphery is contaminated). ▪ Buy clean and/or disinfect all incoming material. ▪ Restrict entry to necessary people only and decontaminate visitors, ie: require downtime, shower pre-entry, hand wash and sign a Premise Visitor Log. ▪ Prevent bird, rodent and other animal entry into barns.
PERIPHERY	THE OVERALL GOAL IS TO PREVENT CONTAMINATION OF BARN PERIPHERY ▪ Restrict traffic to necessary vehicles and people only, i.e. have adequate signage and locked gates. ▪ Allow no pigs from other farms access to periphery. ▪ Create a wash protocol for incoming vehicles, feed or livestock transport, log vehicle movement in the Premise Visitor Log. ▪ People and equipment do not enter animal buildings without decontamination (outside clothes and boots do not enter barn). ▪ Effective rodent/bird control program in place. ▪ If practical, define clean area where uncontaminated vehicles travel and park and outline a potentially contaminated area where possibly contaminated vehicles travel and establish a traffic flow to minimize cross contamination.

PUBLIC	WITHOUT AN ANIMAL HEALTH EMERGENCY, IT IS DIFFICULT TO CONTROL PUBLIC AREAS ▪ Site the farm away from other farms and traffic if possible. ▪ Where practical, move animals on routes when there is minimum of any type of livestock traffic.

FOREIGN ANIMAL DISEASE	
INSIDE	SAME AS FOR ENDEMIC DISEASE BUT ALSO: ▪ No new animals into barn, all animal movement stopped either on a voluntary basis or through animal health emergency regulation. ▪ Essential personnel only into buildings. ▪ Enhanced decontamination of people and equipment, i.e. disinfectants approved for Foreign Animal Diseases and regulated downtime. ▪ Restriction of other animal species movement if Foot and Mouth Disease.
PERIPHERY	SAME AS FOR ENDEMIC DISEASE BUT ALSO: ▪ Mandatory vehicle decontamination between farms. ▪ Restricted animal, people and vehicle movement to farm either on an industry voluntary basis or through animal health emergency regulation.
PUBLIC	▪ Restricted animal, and/or contaminated vehicle movement on public roads either on an industry voluntary basis or through animal health emergency regulation.

FOREIGN ZOONOSIS	
INSIDE	SAME AS FOR ENDEMIC and FOREIGN ANIMAL DISEASE BUT ALSO: ▪ Only absolutely essential personnel into buildings equipped with contamination suits, respiration masks and disposable clothing. ▪ Decontamination of all equipment and people on site.
PERIPHERY	SAME AS FOR ENDEMIC and FOREIGN ANIMAL DISEASE
PUBLIC	SAME AS FOR ENDEMIC and FOREIGN ANIMAL DISEASE ▪ but 'ramped up' to include restrictions on people movement in affected region.

Figure 1 FOOT and Mouth Disease in the UK required significant animal movement controls.

Chapter 2 Foreign Animal Diseases Affecting Swine

The following is a summary of several Foreign Animal Diseases affecting swine. If you see signs of any of these diseases, contact your veterinarian or Pork NS immediately.

Foot and Mouth Disease

Foot and Mouth disease is a severe, highly communicable viral disease of cattle and swine. It also affects sheep, goats, deer and other cloven-hoofed ruminants. Elephants, hedgehogs and some rodents are also susceptible to the virus but do not develop clinical signs of the disease. The disease is characterized by fever and blister-like sores on the tongue and lips, in the mouth, on the teats and between the hooves. Many affected animals recover, but the disease leaves them weakened and debilitated. Horses are not affected.

Clinical Signs:
This disease can be confused with several other animal illnesses. Vesicles or blisters are the most common clinical sign. The blisters occur on the nose, tongue, lips, between the toes, above the hooves and on the teats. Foot lesions are accompanied by acute lameness and reluctance to move. Additional signs include fever, depression and loss of appetite or milk production.

Classical Swine Fever

Classical Swine Fever (CSF), also known as hog cholera or swine fever, is a highly contagious viral disease affecting domestic and wild pig populations. The disease ranges from mild to severe and can be fatal. CSF may cause a large number of deaths in affected herds. Symptoms of CSF include fever and redness of the skin, as well as in-coordination, diarrhea and pneumonia. Severe cases of the disease appear very similar to African swine fever.

Clinical Signs:
CFS can vary from mild to severe sickness. In some instances, pigs may suddenly be found dead with no prior clinical signs. There are three main clinical forms of this disease:

Acute form: Symptoms include high fever, depression, loss of appetite, incoordination, stiffness, convulsions, vomiting, diarrhea, nasal discharge, laboured breathing, and often red or purplish skin blotching on ears, snout, limbs and abdomen. The acute form is highly fatal.

Chronic form: Signs include depression, loss of appetite, poor growth, fluctuating fever, constipation and diarrhea. There may be periods of normality. Fatality is lower. Pigs may be chronic carriers of the virus without showing any of the above signs.

Mild form: Poor growth is the most common sign. Pregnant sows may abort or give birth to stillborn piglets. Surviving piglets may be born with tremors or deformities.

Swine Vesicular Disease

Swine vesicular disease is an acute, contagious viral disease of pigs characterized by fever and vesicles (fluid-filled blisters) in the mouth and on the snout, feet and teats. The vesicular lesions are clinically indistinguishable from those caused by foot and mouth disease (FMD). Swine are the only species affected by swine vesicular disease. The illness varies in severity but is rarely fatal.

Clinical Signs:
The clinical signs of this disease may easily be confused with those of FMD:

- fever and loss of appetite
- sudden appearance of lameness in several animals in close contact
- limping, an uncontrollable appearance, or a refusal to move on hard surfaces
- vesicles (fluid filled blisters) on the snout, feet, mouth, tongue and teats
- vesicular ruptures leaving erosive lesions
- foot pads may become loosened or the loss of a hoof may occur
- young animals are more severely affected
- recovery occurs usually within one to three weeks with little to no mortality

Vesicular Stomatitis

Vesicular stomatitis (VS) is a viral disease affecting horses, ruminants such as cattle, sheep and members of the deer and llama families and swine. While VS causes discomfort to affected animals, and may result in loss of markets for live animals, meat and animal genetics, it is most significant because it closely resembles foot and mouth disease (FMD). Foot and mouth disease affects ruminants and swine, and is a devastating disease for producers.

Clinical Signs:
Vesicular stomatitis causes a mild fever and the formation of blister-like lesions on the inside of the mouth, and on the lips, nose, hooves and udder. The blisters break leaving raw, sore areas. Affected animals often salivate profusely, and are unwilling to eat or drink. Some animals, particularly swine, may become lame. The time between infection with the virus and clinical signs may range from two to eight days, and animals generally recover completely in three to four days.

Pseudorabies

Pseudorabies, also known as Aujeszky's disease, is a viral disease causing inflammation of the brain and spinal cord and respiratory infection in domestic and wild animals. The pig is the only natural host for pseudorabies virus; therefore, the disease is of greatest economic consequence to the pork industry. Sporadic fatal cases have been

known to occur in cattle, sheep, goats, dogs, cats, mink, foxes, raccoons and rats. Over the years, pseudorabies disease has increased in incidence and severity in many intensive pig-farming regions in the world, possibly due to changes in swine management practices towards highly intensive production systems.

Clinical Signs:
Newborn: The disease progresses rapidly, usually resulting in death. Entire litters may die. In very young pigs, the only sign may be an inability to move or stand up. Slightly older piglets may have a fever, loss of appetite, vomiting and nervous system signs such as incoordination, drowsiness, muscle twitching, convulsions and paralysis.

Weaner pigs: The mortality rate is lower (five to 10 per cent). The above clinical signs may be present but respiratory signs are more prominent including coughing, sneezing and laboured breathing.

Chapter 3 Biosecurity Measures for Swine Production Facilities

Prevention:

Biosecurity refers to the proactive measures taken to keep diseases out of animal populations where they do not already exist and prevent the spread of disease to other animals. The three key principals of biosecurity are: isolation, traffic control and sanitation.

Recommendations to prevent the spread and/or introduction of infectious diseases:

Based on our knowledge of the sources and transmission of most infectious diseases of swine, the following recommendations have been designed to prevent spread between hog premises and introduction of new infections to susceptible animals. We have outlined these recommendations based on the three key principles of Biosecurity: **isolation, traffic control and sanitation**. Recommended actions for Normal Operations, Green, Yellow and Red Alert conditions are provided.

1. Normal Operations

Under Normal Operations, producers should consistently follow biosecurity measures as outlined in their CQA® program (CQA® Producer Manual, Chapters D6 & D8).

1. Always maintain a Premise Visitor Log. This log will be used by the CFIA for a trace back situation. The Log tracks the movement of people and vehicles during the incubation period of a disease. Refer to Tab 13 of Reference Manual.
2. Always keep good production and health records.
3. There is in place a passive surveillance for disease conditions (observation and serology where appropriate), regular herd health checks, autopsies and serology.
4. All suspicious cases are to be investigated early to ensure any outbreak of disease is detected early.
5. Always maintain standard biosecurity, sanitation and communication protocols (industry minimums).
    a. Keep the doors of the swine barn locked at all times.
    b. Only introduce animals from swine farms whose health status is known.
    c. Only use semen from certified insemination centers.
    d. Reduce casual visits as much as possible and keep a record (log book) of all visitors entering farm buildings.
    e. Have a double–entry biosecurity system so that all people who enter the swine barn must pass through an entrance room where they must wash their hands, leave their outer street clothes and shoes and put on clothes and boots suited to the animal facility.

f. Prevent vehicles, especially livestock vehicles that are not empty and clean, from approaching livestock buildings, or entering property.
g. Do not use waste from food services as swine feed.
h. Prevent access to buildings by all wild and domestic animals, rodents and strays.
i. Minimize the transfer of material and equipment between premises. Wash and disinfect any material or equipment that may have been used on other livestock premises.

(A) **Isolation** refers to the confinement of animals within a controlled environment that excludes vectors of disease. A barn keeps your animals in and it also keeps other animals out. Mechanical transmission of virus by anything that can walk, crawl or fly from farm to farm should be presumed.

1. Keep a pair of boots in each barn that are worn only in that barn. Install benches the width of the barn entry room to act as a physical barrier. Every time you enter, put the boots on. Leave them in the barn every time you exit. Clean and disinfect the boots daily to minimize cross contamination.
2. Clean away vegetation and garbage around hog barns and pens to remove shelter and food for possible carriers of disease. Clean a distance of 4 feet and apply crushed rock/stone to deter rodents.
3. Institute a vector control program for insects, mammalian and avian vectors. These vectors are important because they can mechanically carry infected feces from one barn, pen or premise to another.
4. Improve barriers to prevent the access of wild animals to hog barns.
5. Rodents have been implicated in the transfer of swine viruses. Rodent control and preventing their movement between barns on a single premise is essential.
6. Eliminate sources of food and water for wild animals. Clean up spills when they happen.
7. Advise employees not to raise their own hogs. Also advise them not to visit other hog premises when they might also have contact with your herd.
8. Avoid dead wild animals. Any carcasses found on your premises must be treated as though they are highly infectious. Handle them with gloves, place in a plastic bag, seal it and dispose of it properly, preferable by incineration or composting. Shower and change your clothes before entering hog facilities.

(B) **Traffic Control** includes the traffic onto your farm, the traffic patterns within the farm and the traffic leaving your farm.

1. The spread of swine diseases follows movement of people and traffic.
2. Be a good neighbor. If you suspect a disease, initiate a self-imposed quarantine.
3. Keep logbooks of visitors to your facilities. Visitation logs can provide useful information for tracing a disease outbreak.

4. Keep human farm-to-farm traffic to a minimum. Conduct business by phone when possible.
5. Find out where someone has been before inviting them on to your premises. Inspect visitors for evidence of cleanliness and contact with other animals before they come on to your premises.
6. Make no unnecessary visits to other farms.
7. Do not let truck drivers, repairmen or delivery personnel step out onto your facility without clean or new protective foot covering and clean coveralls. It is best to provide plastic/rubber boots and coveralls for this purpose. Shoes and clothes are an excellent vehicle for the transmission of viruses.
8. If your company has several farms, establish zones to prevent one person from traveling to all farms.
9. Require employees and crews to wear freshly laundered clothing or clothing supplied at the farm each day. Do not allow persons employed at other hog operations on your premises without an appointment and 24 hours without any contact with hogs.
10. Infected carcasses can be a significant source of virus. Dispose of dead animals as soon as possible, according to acceptable practices.

(C) Sanitation addresses the disinfection of materials, people and equipment entering the farm and the cleanliness of the personnel on the farm. Consult your veterinarian to select the best products for your usage needs.

Organic material greatly increases the resistance of viruses to disinfection.

The specifics of cleaning and disinfecting any facility will depend on many factors that differ among farms. It is not possible to address each individual concern in this document. However, the following guidelines generally address cleaning and disinfection and some facts that should be considered when developing a strategy for barn cleaning and disinfection. In all situations, it is highly recommended that your veterinarian be consulted to help develop and implement any cleaning and disinfection plans.

1. Viruses are sensitive to most disinfectants but organic material must be removed before disinfection can be effective.
2. Most viruses can also be inactivated by heat, such as that produced during composting. There are examples of heating barns to 90°F or higher to kill the virus.
3. Prevent the spread of virus on equipment. Make sure that service person's vehicles are not contaminated with litter or feces. Wash and disinfect the tires and wheel wells of any vehicles coming onto your premises. Alternatively, vehicles can be parked outside the farm perimeter in a visitor's parking area. Service people can put on disposable footwear and walk on to the farm. Upon leaving, the footwear should be placed in a garbage receptacle provided at the farm exit.

4. Wash and disinfect manure clean-out equipment taken from farm to farm.
5. Enclose all dead animals to be taken to the laboratory in plastic. Confine live animals being submitted to the laboratory in boxes that will not return to your farm. Disinfect any vehicles returning from the laboratory including the floor mats. Do not let personnel who have been to the laboratory return to your facility without a shower and a change of clothes.
6. Do not allow vehicles in areas grossly contaminated with manure.
7. Viruses can be transmitted at hog processing plants. Equipment must be cleaned and disinfected at these facilities to prevent the spread of virus to producers bringing their hogs to the plant. Livestock trucks should also be cleaned and disinfected before leaving the plant.
8. Manure Treatment: In the event of a confirmed FAD infection, manure handling will be under control of the CFIA.

Disinfectants and procedures that can be used for destroying Swine viruses:

Most viruses are sensitive to almost any disinfectant. However, it is very difficult to inactivate the virus if it is in organic material, such as feces.

Equipment to use in this and other biosecurity programs:

1. Portable high-pressure sprayers that will deliver 500-1000 psi at up to 4 gal/min are required in washing and disinfecting equipment and hog barns.
2. Hand-held sprayers are helpful for spraying disinfectants on the floor mats of cars, disinfecting wheel wells, etc. In addition, the same type of sprayer can be used to distribute insecticides in a vector control program.
3. Disposable coveralls, boots and caps are needed for visitors.
4. Other materials important in a biosecurity program include farm biosecurity signs, farm gates, barn door locks and other indications of barriers. These items are important in preventing unwanted human traffic.

2. Notification from Pork NS to Producers and Stakeholders

Producers and stakeholders will receive notification of disease threats from Pork NS. The level of Alert will depend on the level of risk to the industry and will be decided on a case by case basis by the Pork NS Emergency Management Team. Producers and stakeholders are an integral part of the response to a suspected or confirmed disease threat. Notification of an Alert Level from Pork NS to producers and industry stakeholders must result in immediate action as outlined in the Alert Level.

There are three Alert Levels – Green, Yellow and Red.

Green Alert

The first level of Alert is the Green Alert.

During a Green Alert

1. All pork producers must verify their CQA® Program biosecurity measures are being followed.
2. All industry stakeholders must verify their biosecurity measures are in place and effective.
3. The industry must remain vigilant and keep abreast of the situation for any further developments or increased risks.
4. All operations and business should proceed as normal but with caution

Phone calls to follow up on the Green Alert will be at the discretion of the EMT.

Pork NS EMT will decide if the Green Alert will be ended or upgraded to a Yellow Alert.

Yellow Alert

The second level of Alert is the Yellow Alert. A Yellow Alert is declared on the suspicion of a FAD in NS. The geographical area of the Yellow Alert will be province wide or a portion thereof.

The effectiveness of the Yellow Alert depends on the total cooperation of the industry. A lack of cooperation may well put the industry at risk.

During a Yellow Alert, producers and industry stakeholders must increase their level of biosecurity by implementing additional biosecurity measures such as:

1. Locking farm gates or securing farm entry points.
2. Cancelling all non-essential work on the farm and restricting access to immediate farm family and essential farm employees only.
3. **Following the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**
4. Implementing a 'by appointment only' delivery system for farm essentials (such as feed delivery, emergency repairs).
5. Making arrangements to clean and disinfect vehicles entering and exiting the farm.
6. Verify Premise Log Book is complete.
7. Read Chapter 3 *Biosecurity Measures for Swine Production Facilities* of the Biosecurity Document found in your Emergency Response Plan Manual.

Signage is recommended on locked farm gates or secured entry points. The recommended wording is: STOP, Advanced Biosecurity in Effect, DO NOT ENTER, Call Farm at (*add your farm contact phone number).*

Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 5 of the Reference Manual for further information.

Pork NS EMT will decide if the Yellow Alert will be ended or upgraded to a Red Alert.

After CFIA notification of a positive test result for a FAD, the Yellow Alert will automatically be upgraded to a Red Alert.

Red Alert

The Red Alert is the highest level of Alert. A Red Alert is declared by the EMT after the CFIA declares an emergency based on the definitive diagnosis of the presence of a FAD. The EMT's STOP movement advisory must be maintained unless directed otherwise by the CFIA. The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine.

The CFIA is the lead agency in dealing with a FAD. The Pork NS EMT will work closely with the CFIA to provide industry advice and technical expertise.

Chapter 4 Biosecurity Measures for Technical Service Personnel

Technical Service Personnel are defined as veterinarians, repair/maintenance, other service personnel to the farm, inspectors and field staff, as well as any other essential visitors that may enter the barn facilities.

The biosecurity measures outlined below, unless specifically identified as green, yellow or red alert protocols, apply to all farm visits by Technical Service Personnel. All visitors should respect individual farm biosecurity protocols.

Communication, preparation and planning steps are critical to effective biosecurity measures when visiting farms:

(A) Prepare vehicle

1. Vehicle Equipment:
   a) Divide the vehicle into clean (such as passenger area, interior of clean equipment box) and dirty compartments (such as trunk of car/truck bed, dirty equipment box). Never enter the clean compartment with soiled footwear and/or clothing.
   b) Rubber (washable) floor mats should be placed for each person in the vehicle.
   c) Use a rubber or heavy plastic liner to cover the entire trunk or truck box. Remove it for cleaning and disinfection.
   d) Place large plastic containers on the liner as equipment carriers. Designate each container as clean or dirty.
   e) Fill a pump up sprayer with disinfectant solution (quat or phenol) for tires and footwear.

2. Personal Biosecurity Kit:
   a) Disposable boots of heavy plastic (at least 6 mil) (conditions permitting) or rubber boots that can be disinfected.
   b) Washable coveralls that can be easily cleaned and disinfected and/or disposable coveralls (reinforced paper).
   c) Disposable head coverings, dusk masks, disposable gloves.
   d) Polyethylene bags to store used coveralls and contaminated articles.
   e) Hand disinfectant and cleaner, paper towels.
   f) Smaller spray or squeeze container filled with disinfectant solution for cleaning small equipment.

3. Equipment Kit:
   a) Keep required testing equipment in a plastic, non-permeable tool box that can be easily cleaned and disinfected. Use separate compartment or a separate box for soiled tools, or put in plastic bags.
   b) Samples for submission should be sealed in plastic bags.

c) Use a plastic clipboard or folder (cleanable) for records.

Know your client's biosecurity expectations and respect them.

- Current biosecurity procedures could include shower, company clothing requirement and no previous hog farm visits in past 24 hours.
- Who should be present for the farm visit.
- History of disease and knowledge of current problems if any.
- If possible, visit youngest to oldest, healthiest to sickest.
- Keep personal daily log of all visits for possible trace-back purposes.
- Technical service personnel should not own pigs.

(B) Farm Entry Procedures

1. Entering laneway:
   - Call ahead for visitation and instructions. Ask if producer has appropriate footwear and clothing.
   - Inform producer on arrival.
   - Drive slowly (less than 15 km/hr) to avoid throwing debris into wheel wells.
   - Avoid large puddles, heavy mud and obvious manure whenever possible. Inform owner if these problems are present.
   - Park in a designated area or where instructed, away from heavy traffic areas and ventilation exhausts.
   - Keep vehicle windows closed to prevent insects from entering.

2. Preparing to enter barn:
   - Put on clean coveralls, disposable boots (hairnet and mask are also recommended) **beside the vehicle**. If ball caps are worn, there must be a clean one for each barn. A supply of clean coveralls, etc. is kept in the clean part of the vehicle.
   - Recommend wearing double plastic boots if spending longer time in barn.
   - Take only the required equipment and recording necessities into barn using cleanable toolbox.
   - Sign and date logbook at entry.

(C) Farm Exit Procedures

- Sanitize hands by washing or using a disinfectant gel prior to leaving barn.
- Remove and dispose of plastic boots. If possible, leave all disposable, contaminated materials at the farm. Otherwise, seal them in a clean plastic bag and put in "dirty" compartment of the vehicle.
- Return to vehicle area.
- Disinfect exterior of test kits, equipment and clipboard with spray disinfectant and wipe with paper towel (and hands if not already washed).

- If equipment is satisfactorily cleaned, it can be returned to the “clean” area of the vehicle. If not, it is placed in designated plastic carriers in the “dirty” compartment.
- Test samples (vials, box pads, samples) are potentially contaminated and must be properly packaged in clean outer plastic bags and stored/carried in “dirty” compartment.
- Remove and dispose of plastic boots. If possible, leave all disposable contaminated materials at the farm. Otherwise, seal them in a clean plastic bag and store in “dirty” compartment.
- Remove soiled coveralls without contaminating street clothing and seal in a heavy duty polyethylene bag or plastic carrier in “dirty” compartment.
- Clean and disinfect hands using hand sanitizer before entering vehicle. Do not cross contaminate by handling “dirty” material again.
- Leave premises.

(D) Return to Base and Sample Submission

- **Submit** all samples to lab as soon as possible. Leave samples inside the clean outer plastic bag. Do not reopen.
- Fill out submission form with identification of farm, sample, full history and tests requested. Sanitize hands and street shoes prior to returning to vehicle from lab.
- **Empty** “dirty” compartment of vehicle completely at least once daily. Immediately dispose of all garbage, preferable in exterior container. Carry dirty laundry inside in the closed plastic bag or container.
- Thoroughly clean and sanitize all equipment used, “dirty” carrying containers – inside and out, and the plastic base they sit on prior to returning them to vehicle.
- Laundry facilities should be easily sanitized and have separate area for receiving dirty laundry (handle as contaminated product), followed by area for washer, area for dryer (clean) and separate clean storage area.
- For washing biosecurity garments, hot water, strong detergent, bleach and high dryer temperatures are recommended.

(E) Vehicle Washing

- Vehicle must be completely washed including interior cleaning, once weekly as a minimum.
- For routine vehicle washing, a commercial carwash is acceptable (drive through or pressure wand). Hose washing with pails/brushes at home in an area with no hog activity is also acceptable.
- Sequence is important: go from top to bottom, outside to inside.
- The cargo area of a half ton truck should be considered vehicle exterior.

1. Exterior**:**
   - Use water at pressure (ideally from a pressure washer) to rinse exterior of vehicle, including wheel wells, wheels and exposed chassis to remove all visible organic material.
   - Wash all areas with detergent suitable for vehicles, ideally using hot water (60-77°C, 140 - 171°F) and pressure application if available (400-500 psi).
   - Using water at pressure, rinse all external areas (can be cold water). Inspect to be sure no organic material/debris remains.

2. Interior (at least weekly, daily in alert situation):
   - Remove and dispose of all garbage. Remove loose objects and clean/sanitize containers before returning them to the cleaned vehicle. Clean/sanitize "dirty" containers inside and out.
   - Remove, wash and sanitize floor mats and trunk liner.
   - Vacuum interior of vehicle including seats, floors and trunk.
   - Clean panels, windows, steering wheel, floor pedals with detergent and disinfectant.
   - Inspect entire vehicle and associated objects for adequate cleaning. Re-clean any deficient areas.
   - Return containers, mats, etc. to their appropriate spots.
   - Clean up cleaning area. Disinfect footwear and hands before entering vehicle.

3. Suitable Disinfectants/Sanitizers:

This is a list of some of the more common ones. There are many more. Note, if degreaser is in formula, it may be hard on vehicle paint!

- Quat, Ammonia: dilution 1:128 (1oz/gal) to 2:128 (2 oz/gal)
  (a) Trade names: Ascend, Swish Food Service 1000 or 2000, Enviro Solutions.
  (b) General purpose neutral disinfectant.
- Phenols: dilution 1:128 (1 oz/gal) to 2:128 (2 oz/gal)
  (a) Trade names: One Stroke Environ, LpH
- Hand Disinfectants:
  (a) Cida Rinse, Bacti-stat, Purell hand sanitizer.
- Note: Virkon is very effective as sanitizer but very corrosive and hard on all metal surfaces.

Notification from Pork NS to Producers and Stakeholders

Producers and stakeholders will receive notification of disease threats from Pork NS. The level of Alert will depend on the level of risk to the industry and will be decided on a case by case basis by the EMT. Producers and stakeholders are an integral part of the response to a suspected or confirmed disease threat. Notification of an Alert Level from Pork NS to producers and industry stakeholders must result in immediate action as outlined in the Alert Level.

There are three Alert Levels – Green, Yellow and Red.

Green Alert
The first level of Alert is the Green Alert.

During a Green Alert

1. All pork producers must verify their CQA® Program biosecurity measures are being followed.
2. All industry stakeholders must verify their biosecurity measures are in place and effective.
3. The industry must remain vigilant and keep abreast of the situation for any further developments or increased risks.
4. All operations and business should proceed as normal but with caution.

Phone calls to follow up on the Green Alert will be at the discretion of the EMT.

Pork NS EMT will decide if the Green Alert will be ended or upgraded to a Yellow Alert.

Yellow Alert
The second level of Alert is the Yellow Alert. A Yellow Alert is declared on the suspicion of a FAD in NS. The geographical area of the Yellow Alert will be province wide or a portion thereof.

The effectiveness of the Yellow Alert depends on the total cooperation of the industry. A lack of cooperation may well put the industry at risk.

During a Yellow Alert, producers and industry stakeholders must increase their level of biosecurity by implementing additional biosecurity measures such as:

1. Locking farm gates or securing farm entry points.
2. Cancelling all non essential work on the farm and restricting access to immediate farm family and essential farm employees only.
3. **Following the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**
4. Implementing a 'by appointment only' delivery system for farm essentials (such as feed delivery, emergency repairs).
5. Making arrangements to clean and disinfect vehicles entering and exiting the farm.
6. Verify Premise Log Book is complete.
7. Read Chapter 4 *Biosecurity Measures for Technical Service Personnel* of the Biosecurity Document found in your Emergency Response Plan Manual.

Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 6 of the Reference Manual for further information.

Specific Measures for Biosecurity Yellow Alert

- Spray tires and undercarriage with disinfectant at road prior to entering laneway.
- Park a minimum of 200 feet from barn or at entry to the farm.
- Disposable gloves, hairnet and mask are all required. A second pair of disposable boots is put on just prior to entering the barn. If suspicious history, a second pair of disposable coveralls is put on prior to entering barn.
- At the farm entrance before exiting, use a sprayer to disinfect wheels, wheel wells and street footwear. Clean and disinfect outside of sprayer before returning to "dirty" area.
- The vehicle exterior must be washed between each farm visit. The interior must be cleaned before entering vehicle. In case of serious or exotic diseases, a waiting period of at least 72 hours may be imposed before having further contact with live hog or hog premises.
- Disinfect all vehicle surface areas with approved disinfectant (quat ammonia or phenol) using hand sprayer or proportion sprayer.
- Mist interior of vehicle with Lysol Spray.

Pork NS EMT will decide if the Yellow Alert will be ended or upgraded to a Red Alert.

A positive test result for a FAD will immediately move the Alert Level to a Red Alert.

Red Alert

The Red Alert is the highest level of Alert. A Red Alert is declared by the EMT after the CFIA declares an emergency based on the definitive diagnosis of the presence of a FAD. The EMT's STOP movement advisory must be maintained unless directed otherwise by the CFIA. The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine.

The CFIA is the lead agency in dealing with a FAD. The Pork NS EMT will work closely with the CFIA to provide industry advice and technical expertise.

Chapter 5 Biosecurity Measures for Feed Companies, Livestock Transporters and Deadstock Collectors

Notification of Disease Threats from Pork NS to Producers and Stakeholders
Producers and stakeholders will receive notification of disease threats from Pork NS. The level of Alert will depend on the level of risk to the industry and will be decided on a case by case basis by the EMT. Producers and stakeholders are an integral part of the response to a suspected or confirmed disease threat. Notification of an Alert Level from Pork NS to producers and industry stakeholders must result in immediate action as outlined in the Alert Level – Green, Yellow and Red.

There are three Alert Levels – Green, Yellow and Red.

Green Alert
The first level of Alert is the Green Alert.

During a Green Alert

1. All pork producers must verify their CQA® Program biosecurity measures are being followed.
2. All industry stakeholders must verify their biosecurity measures are in place and effective.
3. The industry must remain vigilant and keep abreast of the situation for any further developments or increased risks.
4. All operations and business should proceed as normal but with caution.

Phone calls to follow up on the Green Alert will be at the discretion of the EMT.

Pork NS EMT will decide if the Green Alert will be ended or upgraded to a Yellow Alert.

Yellow Alert
The second level of Alert is the Yellow Alert. A Yellow Alert is declared on the suspicion of a FAD in NS. The geographical area of the Yellow Alert will be province wide or a portion thereof.

The effectiveness of the Yellow Alert depends on the total cooperation of the industry. A lack of cooperation may well put the industry at risk.

During a Yellow Alert, producers and industry stakeholders must increase their level of biosecurity by implementing additional biosecurity measures such as:

1. Locking farm gates or securing farm entry points.
2. Cancelling all non essential work on the farm
3. **Following the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**

4. Implementing a 'by appointment only' delivery system for farm essentials (such as feed delivery, emergency repairs).
5. Making arrangements to clean and disinfect vehicles entering and exiting the farm.
6. Verify Premise Log Book is complete.
7. Read Chapter 5 *Biosecurity Measures for Feed Companies, Livestock Transporters and Deadstock Companies* of the Biosecurity Document found in your Emergency Response Plan Manual.

Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 5 of the Reference Manual for further information.

Pork NS EMT will decide if the Yellow Alert will be ended or upgraded to a Red Alert.

A positive test result for a FAD will immediately move the Alert Level to a Red Alert.

Red Alert
The Red Alert is the highest level of Alert. A Red Alert is declared by the EMT after the CFIA declares an emergency based on the definitive diagnosis of the presence of a FAD. The EMT's STOP movement advisory must be maintained unless directed otherwise by the CFIA. The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine.

The CFIA is the lead agency in dealing with a FAD. The Pork NS EMT will work closely with the CFIA to provide industry advice and technical expertise.

The following is a listing of *specific* biosecurity procedures that are recommended for feed companies and livestock transporters to follow during normal operations, during an Information Alert, Yellow Alert and Red Alert.

A. Preparation Procedures

A1. Personal Preparation

Normal Operations

Recommended procedures in the normal course of business, under normal conditions are as follows:

1. Follow company's standard procedures for personal preparation.
2. The company employing the driver is responsible for ensuring that the employee has been fully trained in biosecurity procedures.
3. Monthly review of biosecurity procedures should be practiced.
4. Shower and change clothes at home on a daily basis.
5. Travel from youngest animals to oldest and healthy to sick animals where possible.

6. During winter months wear layers of non-bulky clothing under coveralls (no winter parkas).

Green Alert

1. Ensure all biosecurity procedures are being followed.
2. Remain vigilant and keep abreast of the situation.
3. All operations should proceed with caution.

Yellow Alert

1. Change clothes and footwear at work and place in a sealed container (separate dirty and clean containers). Wash work clothing at work or wash separately from everyday clothing.
2. Leave footwear at work and spray entire footwear with disinfectant at the end of a shift.
3. Shower at the end of the shift. Prevent the travel of disease by changing into clean clothes outside the barn during and/or after the visit.
4. Clothing and/or any other materials that are used inside the barn must not be worn/used outside the barn during and/or after the visit.
5. Be aware of the animal health status on farms.
6. Check with dispatch for routing instructions.
7. Travel from youngest animals to the oldest and healthiest to sick animals where possible.

Red Alert

1. Follow all biosecurity precautions listed under the Yellow Alert above.
2. CFIA protocols for animal and product movement, cleaning and disinfection and quarantines will be implemented.

A2. Vehicle Preparation

Normal Operations

Recommended procedures in the normal course of business, under normal conditions are as follows:

1. Large washable (rubber/plastic) containers designated as clean or dirty for storing the appropriate equipment and clothing between farm visits.
2. Keep an information log of all daily truck activity (company vehicle and contract carriers) for possible trace-back purposes.

Green Alert

1. Ensure all biosecurity procedures are being followed.

Yellow Alert

1. Keep clean areas and items separate from dirty items and areas. Designate a clean (i.e. passenger area) and dirty (i.e. truck bed, equipment box, etc) area of the vehicle and use those areas accordingly. Never enter any clean area with soiled footwear and/or clothing.
2. Use washable (rubber) or disposable floor mats for each person in the vehicle.
3. Keep a pump up sprayer full of disinfectant solution (quat or phenol) for tires and footwear.
4. Keep hand disinfectant and cleaner, paper towels and Lysol in the truck cab.
5. Personal biosecurity kits should be restocked daily and stored in designated clean area of vehicle.

Red Alert

1. CFIA protocols for animal and product movement, cleaning and disinfection and quarantines will be implemented.

A3. Personal Biosecurity Kit

Normal Operations

1. Know the customer's biosecurity requirements and respect them.
2. Current biosecurity procedures could include shower, company clothing requirement, no previous hog visits for 24 hours, etc.
3. Farm/manager owner has the right to inspect all vehicles, equipment, footwear and clothing.
4. Clothing and/or any other materials that are used inside the barn must not be worn/used outside the barn during and/or after the visit.

Green Alert

1. Ensure all biosecurity procedures are being followed.

Yellow Alert

1. Wear footwear that can be sanitized. If using disposable boots, they should be at least 6 mm thick plastic.
2. If barn is to be entered, wear washable coveralls that can be easily cleaned and disinfected and/or disposable coveralls (reinforced paper).
3. Disposable head coverings, dusk masks, disposable gloves (or several pairs of clean work gloves for the day).
4. Use polyethylene bags to store used coveralls, gloves and other contaminated articles.

5. A small spray or squeeze container filled with disinfectant solution is useful for cleaning small areas (i.e. floor mats).
6. Keep a plastic clipboard or folder (must be cleanable) for records (information log). This must be cleaned on a daily basis at the end of every shift.

Red Alert

1. Use disposable boots of at least 6 mm thickness.
2. If barn must be entered, use disposable coveralls (reinforced paper).
3. Wear disposable head coverings, dusk masks, and disposable gloves.
4. Use polyethylene bags to store used coveralls, gloves and other contaminated articles.
5. A small spray or squeeze container filled with disinfectant solution is useful for cleaning small areas (i.e. floor mats).
6. Keep a plastic clipboard or folder (must be cleanable) for records (information log). This must be cleaned after every use.

B. Farm entry Procedures

Normal Operations

1. Follow any procedures required by the customer.
2. **Drive slowly** (less than 15km/hr) to avoid tires throwing debris into wheel-well.
3. Avoid large puddles, heavy mud and obvious manure whenever possible.

Unsuitable driving conditions should be reported immediately to dispatch or office.

Green Alert

1. Ensure all biosecurity procedures are being followed.

Yellow Alert

1. Follow the EMT's *Industry's STOP Movement Advisory* if one is issued.
2. Safely pull off highway into laneway or designated area and stop.
3. Immediately upon exiting the truck, all personnel are to put on sanitizable or disposable boots and clean gloves (if using gloves).
4. Ensure disposable or clean sanitizable floor mat is in place in cab of truck.
5. Disinfect tires and undercarriage of vehicle.
6. Follow any additional procedures required by the customer.
7. Re-enter cab and **drive slowly** (less than 15km/hr) to avoid tires throwing debris into wheel well.

8. Avoid large puddles, heavy mud and obvious manure whenever possible. Unsuitable driving conditions should be reported immediately to dispatch or office.
9. Keep vehicle windows and doors closed while on farm property to prevent insects from entering.
10. Feed pipes must be disinfected before placing in storage compartment.
11. Feed truck drivers should not enter the feed box of the truck without the permission from their supervisor.
12. Feed truck drivers are not to enter any barn or building attached to the barn. Truck drivers and/or other personnel must follow procedures outlined before entering the barn. Refer to Chapter 4 *Biosecurity Measures for Technical Service Personnel* of the Biosecurity Information Document found in your Emergency Response Plan Reference Manual.

Red Alert

1. Follow procedures steps 1 – 9 in Yellow Alert section above.
2. Follow any additional procedures required by the CFIA and/or the customer.
3. Feed pipes cannot be dragged between bins on farm.
4. Feed truck drivers are not allowed to enter the feed box of the truck while in the red zone.
5. Feed truck drivers are not to enter any barn or building attached to the barn for any reason.
6. It is unlikely that hog trucks/shipping vehicles will be allowed to enter the red zone. If they are allowed, then specific procedures, licensing, disinfection and sealing of trucks may be required by the CFIA.

C. Barn Entry Procedures (Sales Representatives, Herd Service Personnel, etc.)

Normal Operations

1. Put on clean coveralls, disposable boots (or easily sanitizable boots which can be sanitized prior to barn entry) and hairnet beside the vehicle.
2. Try to minimize the tracking in and out of the barn by having one person on the truck and another in the barn, when unloading breeding stock, weaners, etc.
3. Disinfect hands and walk to door leading into the barn area.
4. Follow any additional procedures as required by the customer.

Green Alert

1. Ensure all biosecurity procedures are being followed.

Yellow Alert

1. Put on clean disposable coveralls, disposable gloves, disposable boots, mask and hairnet beside the vehicle.
2. Carry a pair of disposable boots to be worn into the barn.
3. Disinfect hands and walk to door leading into the barn area.
4. Put on second pair of boots and enter barn.
5. Disposables should be disposed of on-farm.

Red Alert

1. Do not enter infected zone. Use other means of communication such as telephone to reach producers in the red zone.

D. Barn Exit Procedures

Normal Operations

1. Sign the Premise Visitor Log book and fill out any necessary paperwork.
2. Wash or disinfect hands before exiting the barn.
3. Remove and dispose of disposable items at the door.
4. Return to vehicle; sanitize any equipment with disinfectant.
5. Clean and sanitize footwear before entering vehicle.
6. Remove washable coveralls without contaminating street clothing and seal in plastic bag and keep in dirty section of vehicle.
7. Clean and disinfect hands before entering vehicle.

Yellow Alert

1. Sign out on the Premise Visitor Log book and fill out any necessary paperwork.
2. Wash or disinfect hands before exiting the barn.
3. Upon exit, remove second pair of boots at barn door, hairnet, mask and dispose of them.
4. Return to vehicle, sanitize any equipment with a disinfectant.
5. Remove and dispose of first pair of boots.
6. Remove coveralls without contaminating street clothing and dispose of on farm.
7. Clean and disinfect hands before entering vehicle.

Red Alert

1. Do not enter red zone. Use other means of communication such as telephone to reach producers in the red zone.

E. Farm Exit Procedures

Normal Operations

1. Follow any procedures required by the customer.
2. **Drive slowly** (less than 15 km/hr) to avoid tires throwing debris into wheel-well.
3. Avoid large puddles, heavy mud and obvious manure whenever possible.

Unsuitable driving conditions should be reported immediately.

Green Alert

1. Ensure all biosecurity procedures are being followed.

Yellow Alert

1. Feed pipes must be disinfected before placing in storage compartment.
2. Proceed to end of laneway or designated area.
3. Disinfect tires and undercarriage of vehicle. Remove as much as possible all mud and manure.
4. Disposable material removed or sanitizable mat disinfected and steering wheel sprayed with disinfectant.
5. Remove disposable boots, gloves or disinfect sanitizable boots and hands (if no gloves worn) before entering cab. Place “dirty” materials in appropriate container and return to mill for proper disposable or sanitization or leave on farm if possible.

Red Alert

1. Follow all procedures in Yellow Alert above.
2. If leaving quarantined premises, full wash and sanitizing supervised by CFIA will be required before leaving property. A second wash may be required before leaving zone.

F. Return to Base Procedures

Normal Operations

1. Exterior of vehicles should be washed daily, interiors at least once a week.
2. Exterior Cleaning:
   - For vehicle washing, a commercial truck wash is acceptable (drive through or pressure wand) or nozzled hose with pails/brushes.
   - If using a pressure washer, wear coveralls/boots during process and remove/sanitize at completion before entering vehicle.
   - Using water at pressure, spray to rinse exterior of vehicle removing all visible organic material, including wheel wells, wheels, exposed chassis.
   - Wash all areas with detergent suitable for vehicles ideally using hot water (60-77°C, 140-171°F) and pressure application if available (400-500 psi).
   - Using water at pressure, rinse all external areas (can be cold water). Inspect to be sure no organic material/debris remains.
   - Half-ton truck cargo area should be considered vehicle exterior.
   - Sequencing is important: go from top to bottom, outside to inside.
3. Interior Cleaning:
   - Remove and dispose of all garbage. Loose objects and containers removed and exteriors cleaned/sanitized before returning to the cleaned vehicle. "Dirty" containers have been emptied and are cleaned/sanitized inside and out. Thoroughly clean and sanitize all equipment used. Clean dirty "carry" containers inside and out, as well as the base they sit on.
   - Remove, wash and sanitize floor mats and trunk liner. Dispose of any disposables.
   - Vacuum interior of vehicle including seats, floors and trunk.
   - Clean panels, windows, steering wheel, floor pedals with detergent and disinfectant.
   - Inspect entire vehicle and associated objects for adequacy of cleaning procedure. Re-clean any deficient areas.
   - Return containers, mats, etc. to their appropriate spots.
   - Clean up cleaning area.
   - Disinfect footwear and hands before entering vehicle.

Green Alert

1. Ensure all biosecurity procedures are being followed.

Yellow Alert

1. Exterior of vehicles must be washed between each farm visit. Interiors must be cleaned daily.
2. Upon completion of thorough inspection of the vehicle, if it is determined that no debris remains on the exterior, an appropriate disinfectant must be applied thoroughly to all external areas including wheel wells, wheels, exposed chassis (follow washing procedures i.e. top to bottom).
3. Once the exterior of the truck has been washed, the truck must be moved a minimum one truck length from where the exterior was cleaned, before the cleaning of the interior may proceed.
4. After interior cleaning is completed, mist interior of vehicle with Lysol Spray.

Red Alert

1. Follow all procedures listed above.
2. It is important to keep updated with the status of disease in the area.
3. All movements within the surveillance and control zones will be under the direction of the CFIA.
4. Prior to any visit to any farm, appropriate permits must be obtained.
5. Traffic routes must be planned based on movement control zones (high-risk area, surveillance region and control area) and must be as far from hog farms as possible. These control regions are established by CFIA after the declaration of a FAD emergency situation.

G. At Home Base

1. After the truck has been cleaned and disinfected in the above manner, the truck will return to base where it will be determined if the truck will take another load into the quarantine area or if the truck will sit idle.
   If the truck is not required to deliver into the quarantined area, it is recommended that the truck sit idle for 72 hours.
2. Laundry facilities should be easily sanitized and have separate area for receiving dirty laundry (handle as contaminated product); followed by area for washer, area for dryer (clean) and separate clean storage area.
3. Carry dirty laundry inside in the closed plastic bag or container.
4. For washing biosecurity garments, hot water, strong detergent, bleach and high dryer temperatures are recommended

Summary of Biosecurity Recommendations for Pork Production Facilities
Basic Daily Recommendations*

	On Farm Site	Production Area Within a Barn **	Personal Hygiene
Farm Owner/Employees Live on Site	• Farm footwear	• Worn in only one barn or one production area of barn • Barn boots • Coveralls - change if required	Daily: • Shower • Wash hair • Change clothes
Farm Owner/ Employees Live Off Site	• Farm footwear • Park vehicle away from the barn	• Worn in only one barn or one production area of barn • Barn boots • Coveralls - change if required	Daily: • Shower • Wash hair • Change clothes
Occasional Visitors *** Outside barn only. (truck drivers - feed, fuel, etc. equipment reps)	• Street footwear • Park vehicle away from the barn, if possible - unlikely for feed trucks • Separate vehicle entry where possible	• No entry allowed	Daily: • Shower • Wash hair • Change clothes
Occasional Visitors*** Inside barn only. (veterinarians, electricians, equipment repairmen, etc.)	• Street footwear • Park vehicle away from the barn • Minimize cross contamination by vehicles • Separate vehicle entry where possible	• Worn in only one barn or one production area of barn • Disposable 6 mil plastic boots (or barn boots) provided • Coveralls - not reasonable • Wash and disinfect hands and exposed forearms before entry and exit • Masks recommended	Daily: • Shower • Wash hair • Change clothes • Vehicles -- maintain separate clean and dirty vehicle areas

*This chart recommends the basic general biosecurity clothing/measures that should be taken. Please consult with your veterinarian for information specific to your situation.

***Refer to biosecurity section to specifics related to sector.

** CQA® recommends the use of properly maintained bootbaths or the changing of boots between production areas within the barn. Refer to the CQA® Producer Manual for information on disinfectants.

Summary of Biosecurity Recommendations for Pork Production Facilities During a Suspected or Confirmed Disease Outbreak*

	On Farm Site	Production Area Within a Barn **	Personal Hygiene
Farm Owner/Employees Live on Site	• Farm footwear	Worn in only one barn or one production area of barn: • Barn boots • Coveralls - change if required	Before leaving farm site: • Shower and wash hair • Change clothes • Eliminate contact with pigs except at work site; self quarantine
Farm Owner/ Employees Live Off Site	• Farm footwear • Park vehicle away from the barn or at roadway	Worn in only one barn or one production area of barn: • Barn boots • Coveralls - change if required	Before leaving farm site: • Shower and wash hair • Change clothes • Eliminate contact with pigs except at work site; self quarantine
Occasional Visitors *** <u>Outside</u> barn only (truck drivers - feed, fuel, etc. equipment reps).	• Street footwear • Park vehicle away from the barn or at roadway	• No entry allowed	Daily: • Shower and wash hair • Change clothes • Eliminate contact with pigs except at work site • May have required downtime
Occasional Visitors*** <u>Inside</u> barn only. (veterinarians, electricians, equipment repairmen, etc.)	• Street footwear • Park vehicle away from the barn	Worn in only one barn or one production area of barn: • Disposable 6 mil plastic boots (or barn boots) provided • Disposable coveralls • Wash and disinfect hands and exposed forearms before entry and exit • Masks recommended	Immediately following visits: • Shower and wash hair • Change clothes • Do not visit another pig farm for 24 hours
CFIA	CFIA Personnel that come on site will follow CFIA biosecurity protocols and supply their own clothing and equipment.		

*This chart recommends the basic general biosecurity clothing/measures that should be taken. Please consult with your veterinarian for information specific to your situation.

** CQA® recommends the use of properly maintained bootbaths or the changing of boots between production areas within the barn. Refer to the CQA® Producer Manual for information on disinfectants.

***Refer to biosecurity section for specifics related to sector.

D3. Sanitation and Building Design

D3.1 Introduction

D3.1.1 Sanitation

Disease can either cause death or hinder normal development. Good sanitation helps to reduce disease and decreases the need for the use of antibacterial agents.

An understanding of how the microbes responsible for illness survive and multiply helps us define strategies that will also reduce food-borne diseases and the risk of antibiotic residues. **Direct contact** with diseased or carrier pigs or their nasal secretions, saliva, urine and manure is the most common method of pig-to-pig disease spread. Humidity is essential for microbial survival. Therefore, water leaks and the practice of housing more animals than your building's ventilation system can cope with also readily increase humidity and the risk of disease.

Mixing pigs from different areas or sources spreads microbes. An environment such as a pen or transport vehicle, contaminated with secretions left behind by previous pigs, permits transmission by **indirect contact.** *Salmonella,* for example, can survive nine months at 22°C in stored manure.

Inadequate drainage leads to flooding of pens and feeding areas with backed-up manure and also increases bacterial contamination. Manure could also contain violative levels of antibiotics from earlier production stages, if manure pits overflow.

Mechanical vectors, such as boots, dust and tools may carry enough microbes from a pig-contaminated area to infect pigs in another area. Rodents, cats, dogs and flies can be mechanical *and* **biological vectors.** As well as being able to carry microbes the way a pair of boots would, they are capable of multiplying microbes in their bodies. Grain litter and unswept alleyways may feed disease-spreading mice or rats. Cats that freely move in and out of the barn and throughout production areas have the potential to transmit food-borne diseases like *Toxoplasmosis.* Employees are another important mechanical vector. They must be made aware of how they can transmit organisms from one area to another, and must be provided with adequate hygiene facilities.

The simplest sanitation calls for removal of microbes and the conditions that support them.

The choice of disinfectant will vary according to the type of organism targeted and the kind of surface area to be disinfected. Some disinfectants are more costly than others; some shorten the life expectancy of barn equipment and some can be toxic to pigs if not properly rinsed away. The decision about whether to use a phenol-, hypochlorite-, quaternary ammonium or chlorhexidine-based disinfectant depends on the targeted organism.

D3.1.2 Building Design

Building integrity is essential to any production unit. Falling ceilings and other extreme forms of building deterioration do not meet the prerequisite for HACCP-based production.

Building materials must be free of chemicals that could introduce residues to the pig and remain in the pork. Pressure treated lumber should not be used in penning for the same reason that you must not use shavings from pressure treated wood as bedding. The chemicals used to preserve the wood, when ingested, remain in the fat and will result in residues.

Other construction materials used should be sturdy, easily cleaned and free from foreign objects that could become physical hazards to the pork.

A well-designed ventilation system allows for proper control of gases and humidity. Control of humidity is particularly important for food safety in order to remove moisture, the most important item for the survival of microorganisms. Proper control of gases from carbon dioxide, ammonia and hydrogen sulfide provides a healthier environment for growth and maintenance of breeding stock.

D3.2 General

(On-Farm Quality Assessment Form question #25)

- The simplest sanitation program calls for removal of microbes and the conditions that support them. Microbes require humidity to survive. Dust and cobwebs offer a place for bacteria and viruses to grow and survive. The most basic elements of your sanitation program will relate to the removal of these elements through ventilation, sweeping and routine cleaning.
- It is not necessary to apply your sanitation program to each area of the barn at the same time. The CQA® program does require, however, that your sanitation program be applied in each area of the barn at least once per year and that you have a plan for routine maintenance such as sweeping and removal of dust and cobwebs. These maintenance tasks can readily be incorporated into routines.
- All-in-all-out operations should be thoroughly cleaned following each batch of pigs.
- Continuous-flow operations should be cleaned when weather conditions permit adequate drying conditions within the barn.
- Straw-based systems, including barns, polebarns, hoop structures or any other straw-based system held within a structure must have all bedding materials removed at least once per year. It is recommended that bedding be removed more frequently, if possible.
- A thorough cleaning program must address clean-up of spillage of feed, feed ingredients, medications and agricultural chemicals.
- Feeders and feeding areas must be included in your barn sanitation protocol.
- Consider routine scraping of pens to remove excess pig waste while the animals are in the pens.
- Liquid manure pits must be managed to avoid overflow into the pen areas.

D3.3 Cleaning and Disinfection

(On-Farm Quality Assessment Form questions 25a, 25b)

- It is recommended that detergents be used in the sanitation program. Detergents help to remove biofilm, the film of organic matter that sticks to pen floors and walls. This biofilm helps to protect bacteria and viruses from removal and disinfection.
- Consider the use of a garden hose and backpack sprayer, to focus on specific pens, when cleaning in a continuous flow operation.
- Power washing or pressure washing is recommended for rooms that have no pigs in them, are made of impervious surfaces that can withstand the high pressure and which have electrical systems designed with specifications that allow it.
- Consider the use of foaming applicators to permit more visible application of cleaning and disinfecting agents. This application method helps to ensure that you have covered all surfaces and may help increase contact time with surface materials.
- Ensure that you allow surfaces to dry sufficiently. It is recommended that surfaces be allowed to dry for 24-48 hours. A minimum of 12 hours is absolutely necessary.

D3.4 Selection of disinfectants

- Disinfectant activity is improved when organic matter is thoroughly removed from the area.
- Disinfectants should:
  - Work well in the presence of organic matter;
  - Be compatible with soaps or detergents;
  - Be harmless to building materials; and
  - Be relatively non-toxic.
- Carefully read label directions to ensure proper dilution rates and exposure times.
- The various categories of disinfectants include:
  - Phenols
  - Chlorine-based
  - Iodine-based
  - Quaternary ammoniums
  - Aldehydes
  - Peroxygen formulations
  - Alcohols
  - Lime (For more information on lime, talk to your veterinarian, validator or provincial coordinator.)

Consult with your veterinarian to determine an appropriate disinfection routine for your operation.

D3.5 Boots

(On-Farm Quality Assessment Form questions #25, 26, and 27)

- Clean boots can be more effectively disinfected than dirty ones. Research has shown that, for removal of bacteria, scrubbing visible manure off boots using water is as effective as scrubbing visible manure off boots using disinfectants. It is recommended that you provide facilities to pre-clean footwear.
- Be aware that every disinfectant requires a different exposure time. Read the label carefully to ensure that you know how long your boots must be in contact with the disinfectant for effective use. In other words, simply walking through a boot bath will not disinfect boots.
- Boot baths should be long and wide enough so people are forced to walk through them and should be a minimum of 10 cm (4") in depth
- The design of the bath should facilitate easy drainage.
- Boot baths should be protected from the weather.
- Disinfectant should be replaced regularly following the manufacturer's directions. Dirty boot baths are not effective.
- If you have a multi-commodity farm, be aware that you may wear your boots in different areas around your farm and in transit, but that boots can act as a vector for foodborne pathogens and disease organisms. You should not wear the boots you wear on your farm when you go off your farm. (On-Farm Quality Assessment Form question #27)
- Rather than using a boot bath, you may want to consider using different boots for different areas of your production unit. Systems for changing boots range from simply limiting the use of boots to the barn to using different boots in each room and hallway. You may also want to consider having an area to wash boots.

D3.6 Equipment

- Be aware that equipment can also act as a vector for food-borne pathogens. It is recommended that incoming equipment should be cleaned and disinfected when coming from another agricultural operation (On-Farm Quality Assessment Form question #26c)
- Equipment used for storage, mixing and distribution of feedstuffs must be properly cleaned and maintained to minimize the risk of cross-contamination by medicated feeds or feed ingredients, as well as pathogenic organisms, moulds and fungi. *

D3.7 Transport

(On-Farm Quality Assessment Form question #4)

- It is recommended that you avoid using the same vehicles for transporting pigs and transporting other commodities.
- If you must use the same vehicles to haul both live hogs and other products, be aware of the order in which these commodities are being hauled. Take steps to ensure that there is no cross-contamination.
- If you must use the same vehicles for transporting pigs and other commodities, it is recommended that trucks be swept clean, and where necessary and weather permitting, washed between the transport of different commodities. Medicated feed ingredients or farm chemicals may have spilled or left a residue in the truck that could cause a residue in pigs.
- It is recommended that, weather permitting, trucks be washed between shipments of live hogs. Manure can be the source of both biological (e.g. *Salmonella*) and chemical (e.g. drug residues) contaminants.

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INVESTIGATIONS INTO OPTIMAL WASHING AND DISINFECTION TECHNIQUES FOR PIG PENS

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Washing of pens or barns is a routine part of pig production. The reasons are numerous, but the main one is that washing removes bacteria, viruses and parasites left behind from the previous batch of pigs. Most diseases are dose dependant; meaning, the more pathogens pigs are exposed to, the sicker they'll get. Washing the pens reduces the number of disease causing organisms and so the animals grow better and are healthier. In table 1 below are the survival times of some common pig pathogens. The length of survival is dependent on degree of initial contamination, protection by organic matter and exposure to drying and sunlight[1]. Generally, warm temperatures, drying and sunlight will kill pathogens, and moisture, darkness and cold (especially freezing) will preserve them.

Table 1 Survival times of common pig pathogens

Agent	Survival in environment
Mycoplasma Hyopneumoniae	Up to 7 days in organic matter
Actinobacillus Pleuropneumoniae	few days in organic matter
Bordetella Bronchoseptica	
Pasteurella Multocida	8 days in water 6 days in liquid manure
Hemophilus parasuis	short
Streptococcus suis	25 days @ 9 ^{o}C 100 days @ 0 ^{o}C
Salmonella sp	years in manure, 115 days water 120 days in soil
Serpulina Hyodysenteriae	61 days @ 5 ^{o}C 7 days @ 25 ^{o}C
Lawsonia intracellularis	?
E coli	l1 weeks in manure
PRRSv	3 weeks in organic matter 11 days in water
Pseudorabies virus	18 days on steel, manure 2 days, urine 14 days, well water 7 days,
TGE/PRCV	low summer, stable when frozen
Influenza virus	24 - 48 hours
Ascaris suum	years

Cleaning and disinfection, while critical to disease prevention, has not been given as much analysis as it could. Of all the chemicals used inside pig buildings, disinfectants are probably the most potentially hazardous. Listed below are the common disinfectants used in pig production and their characteristics:

Table 2 Properties of Common disinfectants[2]

Disinfectant	***Range of Activity***	**toxicity**
Acids	Bacterial spores, vegetative cells, some viruses	Corrosive
Formaldahyde/ Gluteraldehyde	Bacterial spores, vegetative cells, viruses, fungi, acid-fast bacteria	Potential carcinogen
Iodines	Bacterial spores, vegetative cells, viruses, fungi, acid-fast bacteria	-
Chlorines	Bacterial spores, vegetative cells, viruses, fungi, acid-fast bacteria	-
Hydrogen Peroxide	Vegetative cells some viruses	_
Phenols, cresols	vegetative cells, fungi, acid-fast bacteria, some enveloped viruses	Accumulates in body, neurotoxic
Quaternary Ammoniums	vegetative cells, Gram positive bacteria, fungi, acid-fast bacteria, enveloped viruses	Non-toxic

Disinfectants may be sold in combinations and sometimes with soaps which will improve their activity. It is critical to follow directions and safety warnings. Some disinfectants such as chlorines may react with other disinfectants, and should not be mixed. This paper will present some findings from some trials we have done to evaluate washing and disinfection methods.

Cleaning of a barn is of critical importance as no disinfectant will work in an unwashed barn. Hot water pressure washers offer the use of hot water for washing which has the potential of cleaning more efficiently, however they are more expensive and require more energy and maintenance. Presoaking the pens is used by some producers to help with the washing process which increases the washing time and may increase the water requirements. The use of soap is suggested because it breaks down the biofilm and waxy residues which water alone will not remove[3]. This paper will describe washing pig pens in a commercial finishing barn and comparing the use of:

- hot water to cold,
- presoaking the pens prior to pressure washing,
- the use of a soap.

under Canadian conditions with the aim of providing information to make washing a more efficient process.

EXPERIMENTAL DESIGN

20 pens were washed alternating hot water, cold water or a soap and the study was repeated with all the pens presoaked with water before beginning the washing process. All pens were of equal size (9'x22') fully slatted with one two space wet-dry feeder in each pen. All the pens were dirty from the previous fill of pigs and required washing and

disinfection prior to placement of the next group of pigs. The time required to wash each pen was recorded. Once the pens were washed and allowed to dry one of two disinfectants were applied and compared to four pens which were washed only. The cleanliness was measured with a commercial sanitizing test kit [4]

The pens were filled with 9 week old feeder pigs from one source and placed on a common diet. All pigs were weighed on entry (9 weeks of age) and on marketing.

RESULTS

Table 3 Average Wash time per pen with varied washing protocols

WASH PROCEDURE	Time to wash pen (minutes)	Difference (Minutes)	Time Savings %
Cold Water No Soap No Presoak	68.03	0	0
Cold Water Soap	59.80	-8.23	12.1
Cold Water Presoak	41.39	-26.64	39.1
Cold Water Presoak Soap	36.38	-31.65	46.52
Hot Water No Soap No Presoak	52.61	-15.42	22.6
Hot water Soap	46.24	-21.79	32.0
Hot Water Presoak	32.01	-36.02	52.9
Hot water Presoak Soap	36.81	-31.22	45.9

Table 4 Bacterial Swab counts after washing and disinfection

Disinfectant	Number of bacterial colonies per swab
None	28.4[a]
Disinfectant 1 Hydrogen Peroxide	13.2[b]
Disinfectant 2 Quaternary Ammonium	19.6[a,b]

Table 5 Pig Growth Rate

Washing Method	**Days to Market** 25kg to 110kg
No Disinfectant	98.14 [a]
Disinfectant 1	95.40 [b]

Disinfectant 2	95.11 [b]
Soap Only	95.59 [b]
Soap and Disinfectant 1	92.96[c]
Soap and Disinfectant 2	92.66[c]

DISCUSSION

Overall, the use of hot water decreased washing time about 22%, except in the case of presoaked pens where there was no decrease in wash time compared to cold water. Also, while hot water was more comfortable to apply, it created a fog that can made it harder to see. Presoaking the pens with water to loosen manure appeared to cut washing time almost in half. The use of a soap decreased washing time about 8 minutes a pen (about 12%).

The use of Disinfectant number 1, a Hydrogen Peroxide based product, was able to reduce bacterial load of the pens compared to undisinfected pens. This indicates that to complete the washing process, certainly the use of a disinfectant is beneficial. There maybe some variation due to choice of disinfectant.

The use of hot water had no effect on growth rate, but both disinfectants and the use of soap did. While the use of soap did not appear to lower bacterial counts, it did improve the performance of the pigs. The sanitation swab test kits measure only some bacteria, and would not detect difference in viral load or detect difficult bacteria to grow such as *Lawsonia intracellularis* which have a known effect on pig growth and efficiency

Soap acts like a degreaser, and looses dirt and dissolves the waxy biofilm that can coat pen floors and walls. The biofilm can protect bacteria and viruses from washing and disinfection. The biofilm can be hard to remove except with a soap, helps dissolve it.

It appears that washing and disinfection protocols can have a significant impact on productivity. Where possible, producers can evaluate their washing methods to see if they can be optimized.

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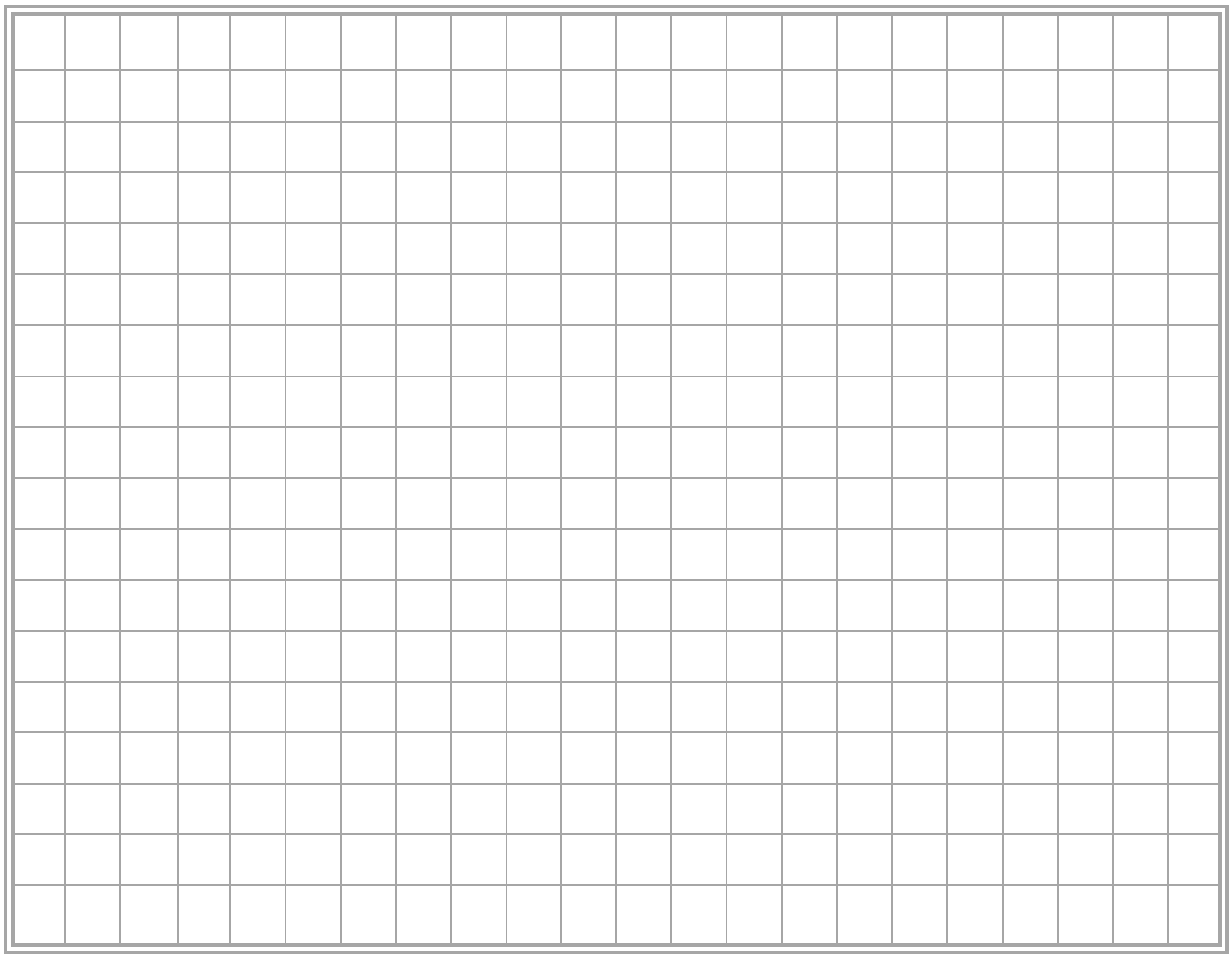
[1] Hurnik D. Epidemiology of Enteric and Respiratory diseases, Proceeding of Amer. Assoc. Swine Pract. 1997, Quebec.

[2] Linton AH, Hugo WB, Russell, AD Disinfection in Veterinary and Farm Animal Practice, Blackwell Scientific Publications 1987.

[3] http://www.cqa-aqc.ca/downloads/producer_manual/PMD3eng.pdf

[4] http://www.millipore.com/catalogue.nsf/docs/MTSK10025

SITE PLAN OF THE PREMISES



Show ALL buildings on the premises. Mark NORTH on the Site Plan.
Identify homestead and all water sources for livestock and humans.
Draw all buildings on the premises and identify those buildings which house animals. Mark the species and numbers of animals in each of those buildings.

Draw yards and pasture areas that animals have access to, cropland, woodlots, entrance ways off public roads, roads, railways, streams, ponds, lakes, public right of way or footpath, or other significant features. ***(Use the site plan you created above for locating these, if it is easier.)***

Outline the perimeter of the property. The size of the property is_____ acres.

Questions that will be asked by the CFIA in the event of a FAD outbreak:

In the last 14 days, can you recall all vehicles and visitors to your farm?

Are you anticipating any vehicles or visitors to your farm in the next 72 hours?

Are any animals on the premise ready for shipment to slaughter in the next 72 hours?_____

Aerial photos can be obtained for many locations at www. maps.google.com

Appendix 4
Identification of Industry Threats, Risks and Hazards

The ongoing identification of industry threats, risks and hazards is an important part of the Emergency Response Plan. Producers should periodically evaluate their barns and the movement of people, animals and vehicles on and off the farm for biosecurity risks. Once identified, producers can take steps to evaluate their procedures and eliminate or least reduce the risks.

Some of the industry threats, risks and hazards to be aware of on your farm are:

1. **Cleaning and disinfecting shipping trucks**. Producers must ensure all shipping trucks are cleaned and disinfected after delivery of live hogs to the packing plant. Trucks that have not been properly cleaned and disinfected before leaving the packing plant can transfer disease organisms from the packing plant back to the farm. Also, disease organisms can be potentially transferred to hog farms on the road from the packing plant to the farm.

2. **Movement of trucks.** Trucks that carry livestock to destinations outside the province pose a risk for the transfer of disease organisms back to Nova Scotia. To eliminate this risk, all empty trucks that have carried livestock must be properly cleaned and disinfected prior to returning to Nova Scotia.

3. **Packing plant wash facility design.** The washing facilities at packing plants must be properly designed to allow for a one way traffic flow through the yard. Movement of vehicles must be one way to prevent cross contamination of clean and dirty vehicles. Manure and bedding removed from each shipping truck must be cleared away before entry by the next vehicle. This will allow vehicles to drive through without cross contamination.

4. **Multiple farm stops for market hog pick up.** Travelling to multiple farms for market hog pick up spread disease among several farms before a potential problem is detected on a particular farm.

5. **Movement of farm equipment between farms**. The potential for the transfer of disease organisms from farm to farm is very high when moving farm equipment such as manure spreaders between farms without proper cleaning and disinfection

6. **Movement of breeding stock.** The movement of breeding stock between provinces or to new farms before acquiring any history of potential problems can result in the movement of disease organisms into new areas, where the resulting potential for a serious disease outbreak would be high.

7. **Semen purchase and use.** Farms should purchase semen with a known certified health status. Boars in the stud may be carriers of a disease threat that can be transmitted through the semen. As well, the physical transport of the semen, the delivery of the semen to multiple farm sites or a common site where the semen is picked up by multiple farms, is a source of contamination and cross contamination between farms.

8. **Movement of people.** The movement of people on and off farms and between farms poses a risk for the transfer of disease organisms. People can be carriers of disease, especially if they have come into direct contact with animals or manure. Veterinarians, sales representatives and other individuals who enter the barn must exercise caution in their daily work and always adhere to strict biosecurity measures to reduce the risk of being carriers of disease.

Appendix 5
CFIA Disease Control Zones

The disease control zone can be created in two ways:

(1) Disease Control Zones Before the Declaration of a Control Area

Before the Declaration of a Control Area (if appropriate) by the Minister, two zones may be developed around known infected premises:

Infected Zone - In the case of Non reportable Avian Influenza (NAI), a minimum 3 kilometre radius surrounding an infected premises is established as an *Infected Zone.* With Foot and Mouth Disease (FMD) and Classical Swine Fever (CSF), this *Infected Zone* can be enlarged to 5 kilometres. The delineation of the area may vary depending on physical or geographic boundaries and according to the progression of the outbreak.

Restricted Zone - In the case of NAI, FMD and CFS, a minimum 10 kilometre radius measured from the infected premises and surrounding the Infected Zone is established as a *Restricted Zone*. The delineation of the area may vary depending on the physical or geographic boundaries and according to the progression of the outbreak.

(2) Disease Control Zones After the Declaration of a Control Area

Following the Declaration of a Control Area (if appropriate) by the Minister, the disease control zones will be established as follows:

Infected Zone - A zone or zones is established pursuant to the federal *Health of Animals Regulations* (Section 80), which include all the NAI, FMD and CSF positive premises. The outer boundary of an *Infected Zone* is at least 3 kilometres from any known infected premises. The delineation of the area may vary depending on physical or geographic boundaries and according to the progression of the outbreak.

Restricted Zone - A zone established immediately surrounding the Infected Zone using measures based on the epidemiology of the disease under consideration in order to prevent the spread of the causative animal pathogen. The outer boundary of this zone is at least 10 kilometres from any known infected premises.

Security Zone - The geographic area between the perimeter of the Restricted Zone to the edge of the Control Area. This zone is controlled and referred to as a Security Zone to prevent confusion when the rest of the country is referred to as free.

Appendix 6
CFIA – Compensation for Animals

The Canadian Food Inspection Agency (CFIA) provides compensation to owners of animals ordered destroyed under the authority of the *Health of Animals Act*. The compensation program is part of the CFIA's effort to control or eradicate animal diseases that threaten Canada's livestock population.

The compensation program is designed to encourage owners to report disease in their herds and flocks at the earliest signs, thereby preventing or reducing the spread of disease and assisting owners in rebuilding their herds.

The control of animal disease is a shared responsibility of the owner, the industry and the federal government. In addition to the human and animal health benefits of reporting disease in farm animals, public confidence in Canada's safe food supply is enhanced. Early reporting and control of any disease outbreak also helps Canada maintain its excellent international animal health status which bolsters Canadian exports of animals and animal products.

Arriving at a Compensation Value

Compensation awarded to owners is determined by an assessment of the market value of an animal and takes into consideration factors such as genetic background, age and production records. Each animal is evaluated and its market value is determined. However, the compensation awarded is subject to maximum levels set out in the *Compensation for Destroyed Animals Regulations*. The owner is awarded market value less the value of the carcass received if salvage is possible, but if the animal's market value is equal to or exceeds the maximum allowed, the owner is awarded the maximum compensation amount.

For more information on compensation maximums refer to:

Compensation for Destroyed Animals Regulations:

http://laws.justice.gc.ca./en/H-3.3/SOR-2000-233/index.html

PORK Nova Scotia

FACT SHEET

Biosecurity Guidelines During Normal Operations

- Purchase only pigs or semen with a known certified health status and log all incoming sources of animals.
- Any equipment brought into the facility must be new, clean and or disinfected before contact with pigs.
- Vehicles that have contact with other pigs should be washed prior to returning to home farm.
- Vehicles containing other pigs should not enter the barn yard.
- Have signs that indicate visitors must make appointments prior to entry.
- Only necessary visitors should enter pig facilities and only after sufficient time away from other pigs.
- All visitors should sign in on a Premise Visitor Log.
- Workers and visitors should decontaminate (wash hands or shower) and change outer wear and boots prior to entry into pig facilities.
- Inside boots and coveralls are for in barn use only, don't wear them outside.
- Outside boots and coveralls for outside use only, don't wear them inside where the animals are.
- Bedding materials must not be contaminated with manure from any other animals.
- Pets, rodents and birds must stay out of livestock areas.

FACT SHEET

Biosecurity Guidelines During A Green Alert

- **Verify the health status of all incoming animals and semen and/or delay purchases or place in a quarantine until Alert is cancelled or changed.**
- **Verify that vehicles that have had contact with other pigs are washed and disinfected prior to returning to home farm.**
- **Delay visitors if possible until Alert is removed and verify that visitors have had sufficient time away from other pigs.**
- **Workers and visitors must decontaminate (wash hands or shower) and change outer wear and boots prior to entry into pig facilities.**
- **Bedding materials must not be contaminated with manure from any other animals; delay purchases if possible until Alert is removed.**
- **Verify all protocols are working.**
- Any equipment brought into the facility must be new, clean and or disinfected before coming into contact with pigs.
- Vehicles containing other pigs must not enter the barn yard.
- Put up signs that indicate visitors must make appointments prior to entry to farm.
- All visitors must sign in on a Premise Visitor Log.
- Inside boots and coveralls must be for in barn use only, don't wear them outside.
- Outside boots and coveralls for outside use only, don't wear them inside where the animals are.
- Pets, rodents and birds must stay out of livestock areas.

FACT SHEET

Biosecurity Guidelines During a Yellow Alert

- **Follow the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**
- Only essential equipment can enter the livestock facility and must be disinfected prior to entry.
- Farm gates must be locked or farm entry points blocked, all non essential work on the farm cancelled and access restricted to immediate farm family and essential farm employees only.
- All incoming essential vehicles must be washed and disinfected prior to entry.
- All visitors should be restricted to only essential services and they must sign in the Premise Visitor Log.
- Workers and essential visitors must decontaminate (shower) and change outer wear and boots prior to entry into pig facilities.
- Inside boots and coveralls are for in barn use only, don't wear them outside.
- People and vehicles must be washed and disinfected on leaving the premises.
- Keep pets, rodents and birds out of livestock areas.
- Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 5 of the Reference Manual for further information.

FACT SHEET

Red Alert

The Pork NS Emergency Management Team (EMT) issues a Red Alert after the Canadian Food Inspection Agency (CFIA) has confirmed the presence of a Foreign Animal Disease.

The Pork NS EMT is working with the CFIA and the NS Department of Agriculture. Please follow all CFIA protocols.

The Canadian Food Inspection Agency (CFIA) is the lead agency for the control and eradication of this disease.

The CFIA will impose zones around the infected premise(s).

The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine.

Movement controls will be enforced – CFIA permits will be required. The issuance of permits will be based on the disease.

Producers, their families and employees can call the confidential **Farm Family Support Centre Helpline at 1-877-418-7555** for help in dealing with the stress that comes from farming.

Refer all media inquires to Pork NS at 1-800-565-7675.

FACT SHEET

Cleaning & Disinfection of Vehicles During a Yellow Alert

Vehicles can be a vector for disease transmission if they are not properly cleaned and disinfected. The following checklist will provide the procedure for vehicle cleaning and disinfection during a Yellow Alert.

Vehicle Exterior

- □ Exterior of vehicles must be washed ***between each farm visit.***
- □ A commercial drive through vehicle wash, a pressure wand vehicle wash or a nozzled hose with pails/brushes is acceptable.
- □ Wear coveralls and boots while washing the vehicle.
- □ It is important to wash from the top to the bottom of the vehicle.
- □ Using water at pressure, rinse the exterior of the vehicle (including wheel wells, wheels and exposed chassis) removing all visible organic material.
- □ Wash all areas with detergent suitable for vehicles, using hot water if detergent instructions recommend (60-77°C, 140-171°F) and pressure application if available (400-500 psi).
- □ Using water at pressure, rinse all external areas (can be cold water) working from the top to the bottom of the vehicle. Inspect the vehicle to be sure no organic material/debris remains.
- □ The cargo area of a half-ton truck is considered the vehicle's exterior.
- □ Thoroughly inspect the vehicle exterior for any remaining debris. If it is determined that no debris remains, apply an appropriate disinfectant to all external areas including wheel wells, wheels, exposed chassis (follow top to bottom washing procedures).
- □ Remove coveralls and boots used during cleaning and sanitize hands before entering the vehicle.

Vehicle Interior

- □ Vehicle ***interiors must be cleaned daily*** during a Yellow Alert.
- □ The vehicle must be moved the minimum of one vehicle length from where the exterior was cleaned before cleaning the interior of the vehicle.

……continued

FACT SHEET

- □ Remove and dispose of all garbage. Remove loose objects and containers and clean/sanitize their exteriors before returning them to the cleaned vehicle. "Dirty" containers must be emptied and cleaned/sanitized inside and out. Thoroughly clean and sanitize all equipment used. Clean dirty "carry" containers inside and out, as well as the base they sit on.
- □ Remove, wash and sanitize floor mats and trunk liner. Dispose of any garbage.
- □ Vacuum the interior of vehicle including seats, floors and trunk.
- □ Clean the panels, windows, steering wheel and floor pedals with detergent and then with disinfectant.
- □ Inspect entire vehicle and all associated objects for adequacy of cleaning procedure. Re-clean any deficient areas.
- □ Return all containers, mats, etc. to their appropriate spots.
- □ After the interior cleaning is completed, mist interior of vehicle with a flying insect control product.
- □ Disinfect your footwear and hands before entering vehicle.

Cleaning and Disinfection Area and Equipment

- □ Clean up the cleaning and disinfection area including any cloths, brushes and equipment used.

Note: Use a suitable disinfectant recommended by your veterinarian.

On-Farm Euthanasia of Swine

Options for the Producer

Unfortunately, it is inevitable that animals will become ill or injured in such a way that euthanasia will be necessary. It is usually impractical or impossible for a veterinarian to regularly perform euthanasia on farms; euthanasia then becomes the responsibility of the producer. The producer should be aware of the available humane on-farm euthanasia methods and how to perform them.

This brochure is designed to assist producers in making decisions about euthanasia while considering pig welfare, economics, safety and public health. Swine producers and their employees should read this brochure, discuss the different options with their veterinarian and fill out the action plan on page eight. The action plan should be reviewed annually with your veterinarian and your employees.

When illness or injury occur on-farm, the action taken on the part of the producer usually falls into 4 broad categories:

1. **Treatment** - If an appropriate treatment is available and practical.

2. **Slaughter** - If the animal is suitable for transport and human consumption. In Ontario, a **Veterinary Certificate for Direct Transport to Slaughter** must be obtained from a veterinarian if a non-ambulatory animal is to be transported.

3. **Sell or Transfer** - This option may be appropriate in case of injured or disadvantaged pigs that may perform adequately in a different production setting.

4. **Euthanasia** - As a last resort, producers must decide to euthanise animals for humane, economic and public health reasons.

Acknowledgements

Ontario Pork gratefully acknowledges the American Association of Swine Veterinarians' and the National Pork Producers' "On Farm Euthanasia of Swine" booklet for content and graphic support.

Special thanks to Penny Lawlis, Animal Care Specialist for the Ontario Ministry of Agriculture, Food & Rural Affairs, and to all the veterinarians and pork producers who contributed to this project.

For more information contact your provincial or national pork producer organization:

Alberta	*(780) 474-8288*	*www.albertapork.com*
Manitoba	*(204) 237-7447*	*www.manitobapork.com*
Saskatchewan	*(306) 244-7752*	*saskpork@sk.sympatico.ca*
Ontario	*1-877-ONT- PORK*	*www.ontariopork.on.ca*
New Brunswick	*(506) 458-8051*	*nbhog@nbnet.nb.ca*
Nova Scotia	*1-800-565-7675*	*www.pork.ns.ca*
Prince Edward Island	*(902) 892-4201*	*www.peipork.pe.ca*
Canadian Pork Council	*(613) 236-9239*	*www.cpc-ccp.com*

Considerations for Euthanasia:

Human Safety Risks: Producers and their employees must be trained in the proper euthanasia methods to avoid injury.

Pig Welfare: The method chosen should minimize any pain or distress to the animal. **Always check for complete euthanasia.**

Practicality: The euthanasia method chosen should be practical, easy to learn and repeatable.

Suitability: Some methods are only suitable for certain sizes of pigs. (See Table 1.) The euthanasia method should not be objectionable to the person administering the procedure.

Table 1 Euthanasia Methods for Swine: Based on Size

	Farrowing Pig Less than 3 weeks (5.5 kg)	Nursery Pig Less than 10 weeks (32 kg)	Grower Pig Less than 68 kg	Finisher Pig Greater than 68 kg	Mature Sow or Boar
Gunshot	no	yes	yes		yes
Captive Bolt	no	yes	yes		yes
Anesthetic Overdose *{administered by vets only}*	yes	yes	yes		yes
Blunt Trauma	yes	no	no		no

** Carbon dioxide (CO_2) and electrocution are also considered to be acceptable methods of euthanasia. However, it is recommended that producers seek professional advice on the use of either method to ensure human and animal safety.*

Table 2 Euthanasia Methods for Swine: Important Considerations

	Human Safety Risk	Pig Welfare	Skill Required	Cost	Effect	Restrictions
Gunshot	Moderate to high; training needed; security of firearms	Good, correct placement needed	Moderate	Moderate; initial cost of firearm	Discharge of blood from wound	Skill and training required; not for small pigs; firearm regulations
Penetrating Captive Bolt	Moderate to high; training needed	Good, correct placement essential	Moderate	Moderate; initial cost of captive bolt gun	Discharge of blood from wound; should be followed by severing a major artery in adult animals	Some skill and training required; not for small pigs
Blunt Trauma to Head	Very low	Good if performed in small pigs with rapid force strong enough for instantaneous death	Low, proper training required	None	May be emotionally unacceptable / or visually	Only applicable to small pigs
Anesthetic Overdose	Low, if assistance for holding is available	Good, anesthesia followed by respiratory and cardiac arrest	High, proper training for intravenous injection essential	Can only be performed by a licensed veterinarian	Terminal gasping is possible	Anesthetics only available to veterinarians; animals cannot be rendered for pet food

The term "euthanasia" is derived from the Greek terms " eu" for "good" and "thanatos" for "death" - the two words combine to mean "a good death." Euthanasia should be painless, must minimize fear and anxiety, must be reliable, reproducible, irreversible, simple, safe and rapid.

CCAC, Guide Vol. 1 (2nd Ed.) 1993

Details of Table 2:

1. Gunshot and penetrating captive bolt:

These methods stun or kill (depending on the size of the animal) by concussive force and penetration into the brain. Use in adult animals may only stun, therefore it is recommended that the carotid (neck) or brachial (armpit) artery be severed once the pig is rendered unconscious. Both methods are practical when used by an experienced person.

Firearm - Extra care must be taken to ensure human safety when using firearms. The user should be trained in firearm safety and understand the potential for ricochet. A .22 caliber rifle is most commonly used on all classes of animals up to market hogs and young replacement breeding stock. Large boars and sows should probably be bled to ensure effective euthanasia. Animals should be secured by an assistant, using a rope or a snare over the upper jaw of the pig. The assistant should always stand behind the shooter. The gunshot method requires that the firearm be held about 2 to 10 inches from the skull and directed approximately 20° up from the skull toward the brain. If using gunshot, the animal should be restrained outside of the building on soil where danger from ricochet is reduced. Be aware of how this may look to passers by who may not understand why you are shooting an animal.

When using a firearm, it's the ammunition that matters, not the firearm itself. Less powerful ammunition might be suitable at shorter ranges. Ammunition size will depend on whether the animal is market size or is a larger (thicker-skulled) sow or boar.

Captive Bolt - Correct positioning for this method is critical. The shot should be directed at the midline of the forehead, one finger-width above eye level. The penetrating captive bolt should be placed **very firmly** against the skull and directed upward approximately 20° from the skull towards the brain. The trigger is pulled as soon as the correct position and angle are achieved and the animal is not moving. A charge large enough (green cartridge) to cause the bolt to penetrate the skull of a sow or boar should be used.

Captive Bolt / Gunshot

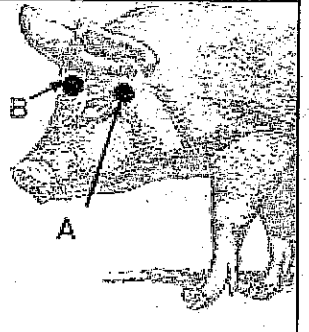


Figure 1:
"A" indicates recommended position for temporal method. Suitable for firearm only.
"B" indicates recommended position for frontal method, at the appropriate angle. Suitable for firearm or captive-bolt pistol.

Lack of maintenance and cleaning is one of the main reasons for poor performance of captive bolt pistols. The pistol should be dismantled and cleaned after each use and stored in its secure housing.

2. Blunt Trauma:

This is a humane and economical method of euthanasia, but it may be objectionable to the person administering it. A sharp, firm blow with a heavy blunt instrument on the top of the head over the brain is an efficient way of humanely killing piglets. It is essential that the blow be administered swiftly, with determination and firmly enough to ensure quick, humane euthanasia on the first attempt. If there is any doubt whether the pig is dead, the blow should be repeated. Contact your veterinarian for proper technique instruction.

Blunt Trauma Method

3. Anesthetic Overdose:

Barbiturates and pentobarbital combinations are used to depress the central nervous system, causing deep anesthesia progressing to respiratory and cardiac arrest. This method is considered to be very humane but it does require intravenous injection into the animal. **Federal drug regulations and provincial veterinarian legislation require anesthetic agents to be administered only by a veterinarian.**

Carcasses from pigs euthanized using anesthetic overdose must be disposed of according to provincial legislation.

Confirmation of Death

Confirmation of death is essential. Immediately following euthanasia, standing animals should collapse; all animals may experience a period of muscle contraction (usually no longer than 20 seconds). This will be followed by a period of relaxation and some poorly coordinated kicking or paddling movements. The pupils of the eyes should be totally fixed and dilated. The animal must be monitored to confirm death. Death may be confirmed by the absence of either breathing, heartbeat or a corneal reflex. To check corneal reflex (blinking response) touch the animal's cornea (surface of the eye); there should be no response to the touch if the animal is dead. The presence of any eye movement or blinking at this time is evidence of sustained or recovering brain activity and the operator should repeat the same or an alternative euthanasia procedure.

Euthanasia Action Plan

Work with your veterinarian to develop a euthanasia action plan appropriate for each stage of production. The plan should be kept in an obvious location in the barn. Review your plan with any new employees and annually with all staff and your veterinarian.

Below is an example action plan for a swine herd.

Farm Name: XYZ Farm

Date: Day/Month/Year

Drafted By: Janet Smith & Dr. Joe Brown

Phase of Production	Euthanasia Method	Alternative Method
Piglets	Blunt trauma	
Nursery (< 70 lb or 32 kg)	Penetrating captive bolt	Gunshot
Grow/finish (up to 300 lb or 136 kg)	Penetrating captive bolt	Gunshot
Mature animals (sows, boars)	Gunshot	Anesthetic overdose (by the vet)

Other Important Considerations

Deciding when and how to euthanise an animal is a difficult task that requires serious consideration. Individual judgement and attitude are important factors. When you have to euthanise an animal, think about how it might look or the impact it may have on those that may be able to see what you are doing but do not understand why it must be done. Again, the need for a simple, instant and reliable euthanasia method is important. Deadstock disposal should meet all legal requirements.

Consult your veterinarian or a swine practitioner for specific instructions on proper techniques and methods that would work best on your farm.

On-Farm Livestock Mortality Management

Canada
Agri-Futures
Nova Scotia's Adaptation Council
Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada
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Nova Scotia Agricultural College

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Foreword

This manual is intended to provide Nova Scotia livestock producers with an improved understanding of on-farm mortality management. It will be of specific interest to producers seeking alternative on-farm mortality disposal options to burial and rendering. It is intended to serve as a practical guide for establishing and managing on-farm mortality biopiles. The focus is on managing what is considered routine, day-to-day livestock mortalities, and is not recommended for managing diseased carcasses. The methods discussed, however, may also be used for handling catastrophic mortality events if management plans are appropriately scaled to accommodate such events.

Introduction

Above Ground Burial Mortality Management

Proper management of farm dead-stock is an important aspect of sustainable livestock production. Traditional disposal methods have included rendering, burial and incineration. These options, however, are becoming either less acceptable or available due to disease, environmental and economic considerations.

A practical alternative to traditional dead-stock disposal methods is an adaptation of traditional composting best described as burial in an above ground biofilter (biopile).

The goal of the above ground biofilter is to use a carbon (C) amendment to accelerate the breakdown of carcass tissue in an environmentally sound manner. It involves a two-phase process (primary and secondary phases) that uses **composting principles** solely to help breakdown the dead-stock material.

The benefits associated with above ground burial management include:

- prevention of nuisances associated with flies, vermin and odours;
- low operational costs;
- reduced risk to ground and surface water;
- nutrients in dead-stock are recycled; and
- increased on-farm bio-security.

Primary Phase

The goal of the primary phase is to reduce carcasses to bones. During this phase, a biopile is formed (Fig. 1), consisting of both: (i) large carcasses, small carcasses and afterbirth (which have a low C to nitrogen (C:N) ratio, a high moisture content and limited porosity); and (ii) a C amendment such as sawdust (which has a high C:N ratio, moderate moisture content and good porosity). Sawdust is an ideal C amendment due to its small particle size, ease of handling and high C content. During this phase the C:N ratio of the mixture should be >50:1 to help reduce odours.

Fig. 1: Sawdust works well as an amendment for managing on-farm mortalities.

At the beginning of this phase, the carcasses and C amendment are layered in a pile. Gases and liquids produced from decomposing carcasses diffuse outward toward the surrounding C amendment layer. This surrounding material supports a diverse population of microorganisms, which form a biological filter. As gases enter the biofilter layer, they are ingested by microorganisms and degraded to carbon dioxide (CO_2) and water vapour.

This phase requires little management, and pile turning is delayed until carcasses have decomposed. For carcasses such as poultry, mink,

sheep and pigs, this period is generally 3 to 9 months after the last carcass has been placed in the pile. For larger carcasses such as cattle, 1 year is typically required. Once carcasses have decomposed, the pile is turned and this initiates the secondary phase.

Secondary Phase

The secondary phase facilitates further decomposition and nutrient stabilization of pile materials. This phase is similar to traditional composting because pile materials are well mixed. For this reason, it is important to monitor the following:

- **nutrient status**: the C:N ratio should be between 25:1 to 30:1;
- **moisture content**: should be between 50% and 60% (wet weight);
- **temperature**: should be monitored weekly; and
- **oxygen**: the pile should be turned on a regular basis (bi-weekly) to ensure that oxygen is supplied.

After completing the primary phase, piles will have a high C content. This requires some consideration if the finished product is intended to be used as a soil amendment. To produce a higher quality finished product, an additional N source should be added at the beginning of the secondary phase to establish a C:N ratio between 25:1 and 30:1.

Since manure is generally available on-farm, it is commonly used as a N source. When adding manure, keep in mind that the pile should contain **1/3 to 1/2 manure**. Inorganic supplemental N sources may also be used such as ammonium nitrate (NH_4NO_3). The addition of about 3 kg of granular NH_4NO_3 per 100 kg of material will provide the N necessary to achieve a C:N ratio within the recommended range (BCMAF, 1996).

Piles are turned several times throughout the secondary phase. Turning reintroduces oxygen and this activates microbial activity and allows for further breakdown of pile materials. This phase is considered finished when pile temperatures no longer increase after turning. This phase lasts for a minimum of 30 days.

After completing the two phases, the finished product will contain very small bone fragments, if any. These fragments are usually quite brittle and pose no health risks or danger to equipment when land-applied. Typically, the entire process takes between 8 and 18 months to complete.

Getting Started

Mortality Management Facility

Farm operations typically manage dead-stock using a windrow (static piles) or bin system. The advantage of a bin facility is the ability for more controlled moisture conditions. The initial input and maintenance costs, however, are greater than those for windrows (or static piles).

A mortality management facility must provide the required conditions that allow for all-weather management, water quality protection, reduction of the spread of disease, prevention of nuisances and maintenance of air quality. Therefore, several factors must be considered when siting a mortality management facility. The site should be:

- well-drained with year-round access to roads and work areas;
- away form areas that are sensitive to groundwater contamination;
- located at least **100 m** from wells or water courses;
- located at least **600 m** from areas zoned residential;
- aesthetically pleasing (trees, shrubs, windbreaks can be used to screen site);
- located near available water treatment areas (i.e. vegetative filter strip, infiltration areas, etc.); and
- located on high ground to prevent surface water from entering the management site.

Piles should be conveniently located. Some operations construct piles close to the farm, while others select more remote sites, such as back fields.

The total area and volume requirements for the facility will be dependent on the size of the operation, number of carcasses to be decomposed and equipment used. The daily average weight of mortalities will need to be determined before sizing and establishing a mortality management facility.

Windrows vs. Static Piles

Windrows and static piles are similar in design. Walls and roofs are not required in these designs, making it easier to load, unload and mix pile materials. Piles are constructed on an all weather surface such as low permeable soil or concrete.

With a windrow design, the length of the windrow is extended as mortalities occur. Windrows are ideal for managing catastrophic mortality events. Windrows are typically **1.0 m to 2.5 m high and 3.0 m to 6.0 m wide**.

Static piles, however, are extended in height rather than length. As mortalities occur, carcasses are layered in the static pile with 30 cm of C amendment placed between mortality layers. In both designs the pile is capped with a 60 cm C amendment (biofilter).

Both static and windrow piles are turned when pile materials have completed the primary phase (Fig. 2). With windrows, however, new sections are continually added, and certain sections are turned before others as they complete the primary phase.

Fig. 2: Static piles are turned once the carcasses are almost fully decomposed.

Stakes or markers may be inserted along the length of the windrow to help distinguish newly constructed sections from older sections. In addition, a log book should be used to keep a record of the turning schedule.

Bins

Bins usually consist of three walls (concrete or treated lumber) (Fig. 3) and a roof (to reduce expenses, a roof may be substituted by a plastic tarp).

Fig. 3: Bins are typically constructed as three-sided enclosures.

To make bin contents easily assessable, the open side of the bin should be about twice the width of the bucket on the turning equipment being used. Bins are usually sized to a maximum depth of 1.5 m and an operating width of 3.0 m.

Covered bins are advantageous over open windrows and static piles, as they provide the following:

- greater ability for stacking materials;
- more controlled moisture conditions; and
- improved temperature control.

To prevent leachate, the bin should be constructed on a concrete pad. The area of the pad will depend on the mortality volume and other operational considerations. As a rule of thumb, a capacity of approximately **1.25 m³ is required for each kg of average daily loss** (see example page 4).

Example:

Primary Phase Volume Required:
54 kg (daily death loss) x 1.25 m^3/kg = 67.5 m^3

Bin Dimensions:
1.5 m x 3.0 m x 3.0 m = 13.5 m^3

Number of Bins Required:
67.5 m^3 / 13.5 m^3 = **5 Bins**

Amendment

Unlike traditional composting, mortality management does not require a precise C:N ratio. In fact, many operations have successfully decomposed carcasses in sawdust without adding supplemental N. The primary N source in the biopiles is the carcasses (C:N ratio between 5:1 and 10:1).

Mortality management requires the addition of a C amendment (examples are given in Table 1) which serves several key functions:

- surrounds the carcasses making them less accessible and attractive to pests;
- absorbs excess liquids released by decomposing carcasses;
- provides structure and porosity which promotes air movement throughout the piles; and
- provides an energy source for microbial growth.

Table 1: C:N ratio and percent moisture values of common carbon sources.

Material	*C:N (weight to weight)*	*% Moisture (wet weight)*
Corn stalks	60-73	12
Corn silage	38-43	65-68
Hay	15-32	8-10
Straw	48-150	4-27
Sawdust	200-750	19-65
Wood chips	451-819	-
Leaves	40-80	-

Source: On-Farm Composting Handbook. 1992. R.Rynk.

The type of C material used will influence the success of the process. For example, wood chips, shavings and straw do not work as well as sawdust due to their larger particle size. With these materials, longer decomposition times are required and leaching of liquids from piles are more likely as compared to sawdust (small particle size).

The amendment should have a moisture content between 50% and 60% (wet weight). A dry amendment (<20%) will not decompose properly and may require the addition of water to obtain the proper moisture content. On the other hand, an excessively wet material may require the addition of a dry amendment to correct the moisture content.

Approximately 2.5 kg of sawdust is required for every kg of carcass that is decomposed. To reduce C requirements, finished material may be used to replace up to 50% of the sawdust. Substituting >50% of the C with finished material may limit C availability and decrease the rate of carcass decomposition.

Starting the Biopile

The following is a step-by-step procedure for managing livestock mortalities on-farm:

- start the primary bin or pile by creating a base. The base should consist of at least 60 cm of C amendment, preferably sawdust;
- place a layer of carcasses on the base, centred 30 cm from the walls of the bin or edges of the pile. Carcasses that are placed directly on the ground, concrete floors or against bin walls will not decompose properly. Carcasses should be evenly spaced and separated by 30 cm of amendment (carcasses should not be stacked);
- try to add carcasses to piles within 24 hours after death, and do not add diseased carcasses;
- in windrow designs, cover carcasses with 60 cm of C amendment. In static piles and bins, cover carcasses with 30 cm of C amendment and continue to layer as necessary;

- once the carcasses are layered (static and bin design), cap the pile with 60 cm of C amendment to provide insulation, retain heat and prevent the release of odours and the attraction of pests to the pile;
- ensure that uncovered piles are mounded for the purpose of shedding rainfall;
- check the pile regularly to ensure that the carcasses are adequately covered (settling of the pile and windy conditions will move the amendment);
- if possible, monitor the temperature once a week, using a long-stem, dial-type thermometer (piles that are started during cold weather may not begin to decompose immediately. If carcasses are buried with the proper amount of amendment, decomposition should begin once air temperatures increase);
- after 3 to 12 months or more, when all of the carcasses have decomposed, transfer the material to a secondary bin or pile (3 to 9 months for smaller carcasses and 9 to 12 for larger carcasses);
- if the pile does not produce heat with turning, additional N should be added. Since manure is generally available, it is commonly used as a N source. When adding manure, keep in mind that the pile should contain **1/3 to 1/2 manure**;
- turn the secondary pile at least twice a month; and
- after **1 to 5 months** in the secondary pile, the material should be finished. Before land-application, a sample of the material should be sent to a laboratory and tested for nutrients (such as N, P and K) and pathogens.

Managing the Pile

Temperature

Primary Phase

In general, high temperatures (>55°C) are desirable, due to their ability to destroy various pathogens, weed seeds and fly larvae that may be present in the pile. According to the Canadian Council of Ministers of the Environment (CCME) guidelines for compost quality, a temperature of 55°C must be maintained for a period of 3 to 15 consecutive days (3 for bins; 15 for windrows) before most pathogens are destroyed (CCME, 1996).

Since mortality management does not require a specific C:N ratio, it may be difficult to obtain high pile temperatures. With a sufficient oxygen supply, a suitable moisture content and a proper C:N ratio, the primary phase will produce elevated temperatures. If optimal conditions are not maintained, the temperature will likely remain within 10°C to 20°C of ambient conditions.

With time, microorganisms will exhaust the pile's oxygen supply, causing the temperature to decrease and indicating the pile should be turned (Fig. 4).

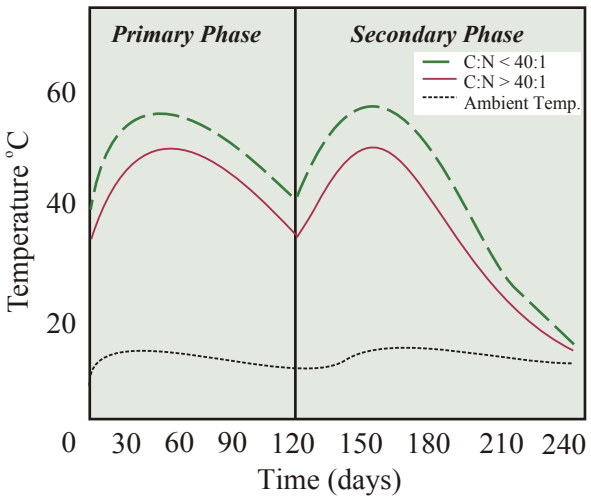

Fig. 4: Typical temperatures produced during the decomposition of mortalities.

Secondary Phase

Once the carcasses have decomposed, the pile is turned and moved to another location to begin the secondary phase. Turning the pile replenishes oxygen supplies, which activates microbial activity and causes pile temperatures to increase.

During this phase, the temperature should be monitored on a weekly basis. Temperature measurements are useful in describing temperature patterns and help indicate when turning should occur.

Temperature is used to determine when the material is finished and is typically monitored by inserting a 60 cm to 90 cm dial thermometer into the centre of the pile, where most of the heat is produced (thermometers may be purchased at local hardware stores). In general, the process is considered to be complete once temperatures no longer increases with turning.

Once several carcasses have been successfully decomposed, a normal temperature pattern should emerge. Deviations from the normal temperature pattern will indicate that one of the conditions for successful decomposition is not being met.

Moisture Content

Ensuring that the pile has sufficient moisture is one of the most important aspects of successful mortality management. A moisture content of 50% to 60% is optimal for carcass decomposition. If the moisture content is too low, the carcasses will decompose at a very slow rate. In general, a handful of material that does not feel moist to the touch is too dry.

Low moisture conditions are typically corrected through the addition of water. Water should be added as needed to obtain a damp feel. Water may be added to smaller piles with a hose, while larger piles will require larger equipment, such as liquid manure handling equipment or tank trucks.

In most cases, the carcasses will provide a moisture content within the recommended range and piles will not require any moisture adjustments, provided a moist amendment is used.

The moisture content of the pile will fluctuate as water is lost through evaporation and added by precipitation. A pile that produces heat will have high evaporative losses, causing the moisture content to decrease with time.

On the other hand, a pile that is not protected from heavy precipitation may become excessively wet. **As a rule of thumb, the pile is too wet if water can be squeezed from the material**. If excessive moisture becomes a problem, dry amendment should be added (this may be done using a loader). Once the carcasses have decomposed, excess moisture may be reduced by turning the pile. Covering the pile with a roof or plastic tarp are two effective methods for protecting the pile from becoming too wet.

Any runoff should be collected and redistributed onto the pile when moisture is needed. If this is not possible, alternative systems should be used to manage these contaminated liquids.

On-Farm Moisture Analysis

Moisture content refers to the amount of water in a material and is expressed as a percentage. Although on-farm methods for determining the moisture content tend to be less accurate than laboratory procedures, they are satisfactory for most on-farm situations.

Prior to conducting an analysis on-farm, an empty sample container must be weighed. A sample is collected, placed in a container, re-weighed and dried. Drying is completed in stages. After each stage, the container and sample are weighed. Once the weight remains constant between two consecutive drying stages, the sample is considered to be dry.

The drying time will vary according to the temperature, drying equipment, sample size and initial moisture content of the material. After a

number of drying experiments, typical drying times may be established. On-farm methods for determining moisture include:

1. Air drying: This is the simplest method for determining the moisture content of a sample. Once the sample is weighed, empty it (<1.5 cm thick layer) on paper in a warm room. Allow the sample to dry for 24 to 48 hours and re-weigh. It may be necessary to repeat these steps, weighing every few hours, until the weight loss is negligible.

2. Microwave drying: A microwave oven will reduce the drying time. The microwave should be dedicated to material testing (i.e. not for household use) and located in a well ventilated area. Experimentation is necessary to determine the drying time for a given microwave oven and sample. To begin, spread a 10 g sample of moist material in a thin layer and place in a microwave-safe container. Heat for 8 minutes at full power (at least 600 watts of power). For a less powerful microwave oven, increase the heating time or reduce the sample size.

After the initial heating, remove the sample from the oven and weigh it. Reheat the sample for another 2 minutes. After reheating, re-weigh the sample. Continue the cycle of heating and weighing at 1 minute intervals until the weight change is negligible. If the sample becomes burned or charred, start over using less power and/or shorter heating times. After determining the required drying time for a particular microwave oven, sample size and material, a standard drying period may be used.

3. Oven drying: Samples may be thoroughly dried at 60 to 104°C in a conventional heated-air oven (for material testing use only and located in well ventilated area). For most materials, a temperature of 100°C is adequate. Rough estimates for drying a 10 g sample range from 24 hours (104°C) to 72 hours (60°C). The drying process may be accelerated by spreading the sample in a thin layer.

Once the sample is dry, a final weight is obtained (container included) and the following equation is used to determine the moisture content (MC) of the original material:

$$MC = \frac{\text{wet weight - dry weight}}{\text{wet weight - container weight}} \times 100\%$$

Turning

The primary phase pile should be turned once the carcasses have decomposed. Turning is very important, as it supplies the pile with oxygen, releasing trapped heat, water vapour and gases. Turning allows all of the material to be exposed to any heat that might be produced at the centre of the pile. Furthermore, turning breaks the material into smaller pieces, which facilitates rapid decomposition.

The secondary phase pile should be turned bi-weekly, although the frequency of turning should be dependent on the following factors:

- rate of decomposition;
- temperature decrease;
- moisture content; and
- porosity.

Piles are usually turned using a front-end loader or manure spreader (Fig.5). Commercial compost turners are available for turning windrows, but are not essential for successful decomposition.

Fig. 5: When a pile is turned, trapped heat, water vapour and gases are released.

Time

The length of time required to decompose on-farm mortalities will be dependent on the temperature and moisture content of the pile and the mass of the carcasses (Table 2). It may be necessary to extend these periods under the following circumstances:

- the pile contains a large number of carcasses;
- a suitable moisture content was not maintained;
- the ambient temperature is cold enough to slow the composting process; and
- additional N, such as manure, was added during the secondary phase.

Table 2: Duration of primary and secondary stages (days) according to carcass mass (kg).

Carcass Mass (kg)	*Primary Stage* (days)	*Secondary Stage* (days)
2	10	10
5	16	10
25	35	12
50	50	15
100	75	25
160	95	30
230	115	40
455	160	55
700	195	65

Source: Ohio Livestock and Poultry Mortality Manual (2000).

Finished Product

Little or no trace of the carcass should be detectable in the finished product. Some bones (skull parts, teeth) will be visible in the material, but they should be soft and easily crumbled. Larger bones can be removed and placed into a primary phase pile for further decomposition, or buried.

If the recommendations provided in this manual are followed, the finished product will be suitable for land-application and will have the following characteristics:

- crumbly texture that allows air to penetrate yet holds moisture, while allowing excess moisture to drain away;
- raw materials are not detectable;
- brown to dark brown in colour; and
- earthy odour.

If optimal conditions are not maintained, the finished material will be high in C, and will be more suitable as a mulch or cover to protect exposed soil during the winter.

To determine the precise nutrient content of the finished product, a sample should be sent to an accredited laboratory. Although temperatures for pathogen kill (>55°C) should be reached during the secondary phase, it is advisable to have samples tested for pathogenic organisms (eg. fecal coliforms <1000 MPN/g dry weight basis (CCME, 1996)).

Guidelines for the Management and Use of Animal Manure in Nova Scotia (R-91-2000) (NSDAF, 1991) should be followed if the end-product is land applied. For some crops, it is important to ensure that adequate time between crop application and crop harvest is allowed for (check crop withdrawal times).

Preventing Scavenging Animals

Scavenging animals may become a problem if the pile is not adequately covered. If this occurs, the problem should be corrected to maintain bio-security and a positive public perception. The easiest way to prevent scavenging animals from the pile is to keep the carcasses covered. Never allow the carcasses to become exposed.

It may be necessary to build a structure to prevent scavenging animals from entering the unit. Maintaining an adequate cover with an amendment (such as sawdust) is less expensive than incurring the additional cost of a fence. Operation and management will determine the needs of the system.

Frequently Asked Questions

Will a pile containing dead animals produce odours and attract rodents?

As long as the carcasses are properly covered with 60 cm of amendment, odours and rodents should not be a problem.

What happens to the pile during the winter?

Carcasses typically decompose more rapidly when the ambient temperature is warm. Pile temperatures of 50°C or higher, however, may be attained when ambient temperatures are as low as -15°C. Frozen carcasses placed in frozen sawdust will not decompose during cold weather, however, they should begin to breakdown once ambient temperatures increase in the spring. Adding more cover material will help retain heat in the winter, providing warmer material with which to cover carcasses that are added during this period. Avoid turning piles during extremely cold weather.

Should the pile be constructed on a concrete pad?

A concrete pad will reduce the risk of water contamination. Any runoff should be collected and redistributed onto the compost pile. Furthermore, a concrete pad will facilitate turning. If a concrete pad is not economically feasible, the pile should be located on sloped land that drains into a collection area. Any uphill surface water should be diverted from the management site (i.e. berm, terrace).

Will there be any problems with pathogens or flies?

As long as temperatures above 55°C are maintained for 3 to 15 consecutive days (3 for bins; 15 for windrows), most pathogens in the material should be destroyed. Flies should not be a problem, as long as a suitable moisture content is maintained (<60%) and the carcasses are not exposed.

Why do some piles fail?

A pile fails when it does not produce heat or produces runoff and/or odour. These problems commonly result from the following:

- failure to provide enough amendment;
- an excessive moisture content; and
- placing carcasses too close together.

Can wet sawdust be used?

Dry sawdust should be used (50% to 60% moisture content), as it can absorb more water and contains more air space. Excessively wet sawdust will lead to the production of runoff and may freeze in the winter.

Can large animals be decomposed?

Although the process requires more time, it is possible to decompose large animals. It is not necessary to cleave or cut animals placed in the pile. To increase decomposition rates, however, it helps to puncture or splay carcasses as they are placed in the pile. Carcasses should not be splayed prior to placement in the pile because the internal organs are difficult to contain and transport.

If sawdust is not available, can other C sources be used?

Although sawdust is the best material for managing mortalities, any organic material with a high C content may be used. Long, fibrous materials, such as hay, should be chopped or ground to reduce the particle size. The material used should settle around the carcass.

Summary

By following a few general composting recommendations, above ground burial mortality management can be a successful, environmentally safe and economically feasible method for disposal of on-farm livestock mortalities.

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PREMISE VISITOR LOG

Premise/Location:_____ Premise ID_____

Date	Time	Visitor's Name*	Reason for Visit	Last Pig Farm Contact	
				Date	Location

*** Visitors are all non-employees that enter the farm premise. All Visitors must follow farm biosecurity practices.**

FACT SHEET

Biosecurity Guidelines During Normal Operations

- Purchase only pigs or semen with a known certified health status and log all incoming sources of animals.
- Any equipment brought into the facility must be new, clean and or disinfected before contact with pigs.
- Vehicles that have contact with other pigs should be washed prior to returning to home farm.
- Vehicles containing other pigs should not enter the barn yard.
- Have signs that indicate visitors must make appointments prior to entry.
- Only necessary visitors should enter pig facilities and only after sufficient time away from other pigs.
- All visitors should sign in on a Premise Visitor Log.
- Workers and visitors should decontaminate (wash hands or shower) and change outer wear and boots prior to entry into pig facilities.
- Inside boots and coveralls are for in barn use only, don't wear them outside.
- Outside boots and coveralls for outside use only, don't wear them inside where the animals are.
- Bedding materials must not be contaminated with manure from any other animals.
- Pets, rodents and birds must stay out of livestock areas.

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FACT SHEET

Biosecurity Guidelines During A Green Alert

- Verify the health status of all incoming animals and semen and/or delay purchases or place in a quarantine until Alert is cancelled or changed.
- Verify that vehicles that have had contact with other pigs are washed and disinfected prior to returning to home farm.
- Delay visitors if possible until Alert is removed and verify that visitors have had sufficient time away from other pigs.
- Workers and visitors must decontaminate (wash hands or shower) and change outer wear and boots prior to entry into pig facilities.
- Bedding materials must not be contaminated with manure from any other animals; delay purchases if possible until Alert is removed.
- Verify all protocols are working.
- Any equipment brought into the facility must be new, clean and or disinfected before coming into contact with pigs.
- Vehicles containing other pigs must not enter the barn yard.
- Put up signs that indicate visitors must make appointments prior to entry to farm.
- All visitors must sign in on a Premise Visitor Log.
- Inside boots and coveralls must be for in barn use only, don't wear them outside.
- Outside boots and coveralls for outside use only, don't wear them inside where the animals are.
- Pets, rodents and birds must stay out of livestock areas.

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Biosecurity Guidelines During Yellow Alert

- **Follow the EMT's *Industry STOP Movement Advisory* for all livestock, semen and deadstock from premise to premise for a 24 to 48 hour period.**
- Only essential equipment can enter the livestock facility and must be disinfected prior to entry.
- Farm gates must be locked or farm entry points blocked, all non essential work on the farm cancelled and access restricted to immediate farm family and essential farm employees only.
- All incoming essential vehicles must be washed and disinfected prior to entry.
- All visitors should be restricted to only essential services and they must sign in the Premise Visitor Log.
- Workers and essential visitors must decontaminate (shower) and change outer wear and boots prior to entry into pig facilities.
- Inside boots and coveralls are for in barn use only, don't wear them outside.
- People and vehicles must be washed and disinfected on leaving the premises.
- Keep pets, rodents and birds out of livestock areas.
- Above and beyond the EMT Yellow Alert, the CFIA can declare mandatory Infective and Restricted Zones around the suspect infected farm. Refer to Appendix 5 of the Reference Manual for further information.

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FACT SHEET

Red Alert

The Pork NS Emergency Management Team (EMT) issues a Red Alert after the Canadian Food Inspection Agency (CFIA) has confirmed the presence of a Foreign Animal Disease.

The Pork NS EMT is working with the CFIA and the NS Department of Agriculture. Please follow all CFIA protocols.

The Canadian Food Inspection Agency (CFIA) is the lead agency for the control and eradication of this disease.

The CFIA will impose zones around the infected premise(s).

The CFIA will implement protocols for animal and product movement, depopulation, cleaning and disinfection and quarantine.

Movement controls will be enforced – CFIA permits will be required. The issuance of permits will be based on the disease.

Producers, their families and employees can call the confidential **Farm Family Support Centre Helpline at 1-877-418-7555** for help in dealing with the stress that comes from farming.

Refer all media inquires to Pork NS at 1-902-895- 0581.

FACT SHEET

Cleaning & Disinfection of Vehicles During a Yellow Alert

Vehicles can be a vector for disease transmission if they are not properly cleaned and disinfected. The following checklist will provide the procedure for vehicle cleaning and disinfection during a Yellow Alert.

Vehicle Exterior

- □ Exterior of vehicles must be washed ***between each farm visit.***
- □ A commercial drive through vehicle wash, a pressure wand vehicle wash or a nozzled hose with pails/brushes is acceptable.
- □ Wear coveralls and boots while washing the vehicle.
- □ It is important to wash from the top to the bottom of the vehicle.
- □ Using water at pressure, rinse the exterior of the vehicle (including wheel wells, wheels and exposed chassis) removing all visible organic material.
- □ Wash all areas with detergent suitable for vehicles, using hot water if detergent instructions recommend (60-77°C, 140-171°F) and pressure application if available (400-500 psi).
- □ Using water at pressure, rinse all external areas (can be cold water) working from the top to the bottom of the vehicle. Inspect the vehicle to be sure no organic material/debris remains.
- □ The cargo area of a half-ton truck is considered the vehicle's exterior.
- □ Thoroughly inspect the vehicle exterior for any remaining debris. If it is determined that no debris remains, apply an appropriate disinfectant to all external areas including wheel wells, wheels, exposed chassis (follow top to bottom washing procedures).
- □ Remove coveralls and boots used during cleaning and sanitize hands before entering the vehicle.

Vehicle Interior

- □ Vehicle ***interiors must be cleaned daily*** during a Yellow Alert.
- □ The vehicle must be moved the minimum of one vehicle length from where the exterior was cleaned before cleaning the interior of the vehicle.

…continued

- □ Remove and dispose of all garbage. Remove loose objects and containers and clean/sanitize their exteriors before returning them to the cleaned vehicle. "Dirty" containers must be emptied and cleaned/sanitized inside and out. Thoroughly clean and sanitize all equipment used. Clean dirty "carry" containers inside and out, as well as the base they sit on.
- □ Remove, wash and sanitize floor mats and trunk liner. Dispose of any garbage.
- □ Vacuum the interior of vehicle including seats, floors and trunk.
- □ Clean the panels, windows, steering wheel and floor pedals with detergent and then with disinfectant.
- □ Inspect entire vehicle and all associated objects for adequacy of cleaning procedure. Re-clean any deficient areas.
- □ Return all containers, mats, etc. to their appropriate spots.
- □ After the interior cleaning is completed, mist interior of vehicle with a flying insect control product.
- □ Disinfect your footwear and hands before entering vehicle.

Cleaning and Disinfection Area and Equipment

- □ Clean up the cleaning and disinfection area including any cloths, brushes and equipment used.

Note: Use a suitable disinfectant recommended by your veterinarian.