Animal Products Industry
Guidelines for Risk Organism Preparedness and Response

October 2009
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1 Scope and Purpose of Guidelines

1.1 Purpose

This guideline:

- Specifies the requirements for the control of risk organisms of significance to the New Zealand Animal Products Industry for the processing of "red meat" e.g.: sheep, cattle, deer, goats, pigs and horses, and their by-products.

- Provides guidance to operators and animal product processors for developing Risk Organism Response Plans.

Rapid implementation of a Risk Organism Response Plan will assist with control and eradication of specific risk organisms, and may lead to an early resumption of international trade.

Operators must be aware that a biosecurity response does not preclude the observance of regulatory requirements specified under the Animal Products Act 1999.

The API Guidelines are intended to be generic and cover a variety of risk organisms. The API Guidelines are aimed at a broad cross section of animal product processors with the intention of rationalising and standardising procedures across the industry.

1.2 Scope

This guideline applies to all animal product processors of cattle, sheep, goats, pigs, horses and deer and their by-products within NZ.

This guideline includes:

- Animal Product Industry responsibilities
- Development and maintenance of Animal Product Industry Risk Organism Response Plans
- Technical Operational requirements
- The role of NZFSA
- The role of MAFBNZ
• The role of Recognised Agency

• Disease information

1.3 References

• MAF 153 Series of Standards; Response Programmes for Exotic Disease of Animals; MAF Biosecurity Authority October 2004

• Biosecurity Act 1993

• Animal Products Act 1999


• OIE Terrestrial Animal Code

• Emerging and Exotic Disease of Animals; 3rd Edition 2006, Edited by Anna Rovid Spickler and James A. Roth; Iowa State University

• Import Risk Analysis; Animals and Animal Products; Noel Murray; MAF Biosecurity Authority 2002

• Better Incursion Response, Better systems and better communications, Biosecurity Magazine Issue 82, 2008

• Inquiry into Government Handling of the GB FMD Outbreak in 2001; Iain Anderson

• Manual on Meat Inspection for Developing Countries; D Herenda: Food and Agriculture Organization of the United Nations Rome, 1994

• The Import into New Zealand of Meat and Meat Products: A Review of Risks Into Animal Health; Stuart MacDiarmid: MAF Biosecurity Authority, 1991
1.4 Acronyms

APA  Animal Products Act
API  Animal Products Industry
CA  Controlled Area
C&D  Cleaning and Disinfection
CIMS  Coordinated Incident Management System
CIP  Cleaning in Place
CTO  Chief Technical Officer
FMD  Foot-and-Mouth Disease
GDP  Gross Domestic Product
IDC  Investigation and Diagnostic Centre (Wallaceville)
ILO  Industry Liaison Officer
IIV  Initial Investigating Veterinarian
IP  Infected Place
MAF  Ministry of Agriculture and Forestry
MAFBNZ  MAF Biosecurity New Zealand
NRC  National Response Centre
NZFSA  New Zealand Food Safety Authority
NZFSAVA  New Zealand Food Safety Authority Verification Agency
OIE  World Organisation for Animal Health (Office International des Epizooties)
QAC  Quaternary Ammonium Compound
RA  Regulatory Authority or Recognised Agency
RC  Response Centre
1.5 Definitions

Animal Products – For the purpose of this guideline, products (meat, hides, skins, wool) derived for human use, for use in animal feeding or for pharmaceutical, agricultural or industrial use.

Authorised Person - A person who has been appointed pursuant to Section 103 (1) of the Biosecurity Act 1993, or an Animal Products Officer who is appointed pursuant to section 78 of the Animal Products Act 1999.

Biosecurity Response – The response to the introduction of risk organisms for the purposes of this document is defined as limited to the animals within the context of this guideline.

Chief Technical Officer - A person appointed pursuant to Section 101 of the Biosecurity Act 1993 to be responsible for strategic decision making during a response.

Cleaning and Disinfection (C&D) – Cleaning is the removal of visible contamination from surfaces. Disinfection is using disinfectant (or sanitiser) to destroy disease carrying micro-organisms. Cleaning & Disinfection is when these are carried out together.

Controlled Area - An area that the Chief Technical Officer has declared a controlled area under and for the purposes of Section 131 of the Biosecurity Act 1993. There may be more than one controlled area and there may be controlled areas within controlled areas, e.g. where some movements should be prevented or conditions imposed over a large area and more stringent movement restrictions or conditions imposed in a smaller area. The whole of New Zealand may be declared a controlled area in the initial stages of a response.

Conveyor – Any thing, living or inanimate, that can transport an organism from infected places to other places, e.g. susceptible and non-susceptible animals, persons, conveyances, wool, meat, milk hay and skins.

Decontamination - The process of removing the ability of the infective agent to act as a source of infection.

Effluent – Liquid or solid waste material discharged from agricultural or industry processes.
**Fomite** – An inanimate object that is capable of transmitting infectious organisms from one location to another.

**Foot and Mouth Disease (FMD)** - A highly contagious viral disease of cloven-hoofed (ungulate) animals, e.g. cattle, sheep, pigs, goats, buffalo, deer and alpacas.

**High risk Areas** - Areas of the factory or site where raw meat or meat products, untreated hides or skins, or untreated effluent is handled or stored. This includes areas such as stock yards, sticking and bleeding areas, gutting areas and areas where intestines etc are washed.

**High risk Farms** - Properties within a 3km radius of the Restricted Place that are more susceptible to the spread of a risk organism.

**Industry Liaison Officer** - An Authorised Person appointed to the Response Centre with the responsibility for liaison with the industry sites, Site Response Officers and obtaining MAFBNZ permits during a response.

**Infected** – The presence of a risk organism in the animal.

**Infected Meat** - Meat that is known to have come from an animal that is infected or suspected to be infected with a risk organism.

**Infected Place (IP)** – A place where infected animals or risk organisms are present. A defined area in which a risk organism exists or is suspected. An infected place is subject to quarantine and eradication control procedures.

**Investigation & Diagnostic Centre (IDC)** - The Directorate of MAFBNZ that is responsible for the investigation and diagnosis of suspect, new or emerging risk organisms located in Wallaceville, Upper Hutt.

**Investigation Phase** - The period from when the IDC Duty Investigator receives notification of a suspected risk organism until the investigation is completed and closed, or the CTO initiates a response.

**Initial Investigation Veterinarian (IIV)** – A veterinarian authorised to carry out an investigation on a suspected case of unwanted organism.

**MAFBNZ** – MAF Biosecurity New Zealand is the division of MAF that has the lead role in preventing the importation of risk organisms and for detecting, controlling, managing or eradicating them should they occur.
**Maintenance Phase** - The period when there is no response or emergency or simulated emergency in operation and the Response Centre and all other suppliers are being maintained in a state of readiness.

**Movement Control** – Preventing disease spread by Controlled Area Notices and Restricted Place Notices and their conditions. Also includes the processing of movement permits, management of perimeter controls, hygiene barriers and signage and the provision of conveyance decontamination sites.

**National Response Centre (NRC)** - The response centre from which the Director General of MAF or the Chief Technical Officer co-ordinates a response, usually located in the MAF Head Office. The NRC links into the whole-of-government emergency management system.

**Not-Negative Diagnosis** - A suspicious case where the possibility of a risk organism cannot be ruled out.

**Notification** – A report via the **0800 80 99 66** number of the suspected presence of a risk organism.

**Office International des Epizooties - OIE** - The World Organisation for Animal Health. OIE recommendations are made by the relevant OIE Commission or International Committee. The physical location and contact numbers of the Headquarters of the OIE are:

12 rue de Prony
75017 Paris
FRANCE

Telex: EPIZOOTI 642285F
Telematic Address: INTEREPIZOOTIES
Telephone: (+33 1) 44 15 18 88
Facsimile: (+ 33 1) 42 67 09 87
Email: OIE@oie.int

**Organism Management** – Decisions on, and programmes for, containing, controlling or eradicating a risk organism under the NRC. Actions may include host depopulation and disposal, vaccination and decontamination of infected places.

**pH Treatment** - Treatment systems which require the pH to be controlled within limits for a specified time. Includes CIP systems, effluent systems, or in-process.

**Procedure** – Technical descriptions of the processes to be undertaken by role holders to ensure polices and plans are implemented effectively and consistently. A procedure should specify, as applicable, the purpose and scope of an activity, what shall be done and by whom, when, where and how it shall be done, what materials, equipment and documentation shall be used.
Protection Zone – A specific area within a Controlled Area. The Protection Zone is the area in the immediate vicinity of all known Infected Places, within which the highest level of biosecurity apply to prevent further spread of infection.

Response – The actions taken immediately before, during or directly after a risk organism has been confirmed where management of the risks posed by that organism is considered appropriate. This includes investigation of suspect risk organisms, identification of the pest or disease, containment, and initial assessments of the organisms’ impact and response options. A response may also be initiated where the impacts of the risk organism have increased, or new response options become available, that make a response feasible.

Response Centre – (RC) – The response centre established during a response. The centre is directly responsible to the CTO that initiates and manages the field-based response.

Response Phase - The period from when the CTO decides to proceed with a response to an outbreak of a suspected risk organism until the time when a stand-down is declared. The response phase includes all the actions to investigate, contain, control or eradicate the risk organism.

Restricted Place - Any place that an inspector or an authorised person has declared to be a restricted place under Section 130 of the Biosecurity Act 1993.

Restricted Place Notice – A legal document served by an inspector or authorised person declaring a restricted place under section 30 of the Biosecurity Act 1993.

Risk Organism – An organism either already present in, or new to New Zealand that poses a potential biosecurity risk. A risk organism may or may not have a defined status under the Biosecurity Act or Hazardous Substances and New Organisms (HSNO) Act (for the purposes of this document).

Risk Organism Response Plan - means a readily available response plan verified to ensure there are response systems to stop the dissemination of risk organisms from an operators premises by containing, destroying and decontaminating any conveyors. The plan also identifies site personnel, responsibilities, procedures, equipment and resources.

Safe Product - In the context of this guideline, product that is deemed free of the risk organism. Includes product manufactured at least 14 days prior to notification of organism response or for as many days as the CTO may stipulate.

Sanitise - In the context of this guideline, the use of chemicals to reduce or increase the pH to specific values for a specified time to inactivate the particular risk organism. Values/times may vary between diseases.
Site Co-ordinator – The person nominated to co-ordinate and develop the Risk Organism Response Plan at each processing site.

Site Response Officer (SRO) – The Authorised Person responsible for ensuring that the Risk Organism Response Plan is being followed during a response. Typically this person will be from an NZFSA approved Recognised Agency.

Spillage/Aerosol Control - Includes visible foam, spray, mist droplets from transport tanker and silo operations.

Stand-Down - Either advise that persons on stand-by will not be required for a response, or a direction given by the CTO that a response is over and all actions relating to the response are to be completed.

Standstill - The cessation of movement of susceptible stock, potentially contaminated goods, equipment or fomites. The standstill should primarily be applied as a part of Controlled Area conditions as one of the initial containment measures. This is aimed to reduce the level of potential spread of infection while activities to define the magnitude of the disease spread within Controlled Areas are underway. Standstill may vary in duration (e.g. 24 hours, 48 hours, or more) as appropriate.

Surveillance/Post Response Phase - Is the period after a response has been stood down but there may be follow-up action to be completed, such as surveillance to establish that eradication/control measures were successful.

Surveillance Zone – An area around Infected Places at risk of local spread of infection, within which patrolling activities occur.

Treated Product - In the context of this guideline meat and meat products that have been processed in conditions that meet the heat and/or pH treatment and control requirements for each specific risk organism.

Untreated Product - In the context of this guideline, meat and meat products manufactured before the implementation of incursion controls could include product processed up to 14 days prior to the emergency or other period determined by the Director MAFBNZ.

Vesicular Disease – Any disease causing vesicles (blisters), usually in the nostrils, tongue and lips, e.g.: Foot and Mouth Disease.
2 Risk Organisms

Risk organisms are organisms that may be present in or new to NZ, which pose a potential biosecurity risk. New Zealand is considered to be free of many of the risk organisms listed by the World Organisation for Animal Health (OIE) – see Annex 1. It is critical that this status is maintained.

2.1 Risk Organisms of Importance to the NZ Animal Products Industry

The probability of a Risk Organism Response in NZ is always present. With increased movement of large volumes of people, animals and animal products around the world, there is an increased risk of movement of risk organisms. The importance of vigilance and preparedness cannot be over-stated.

MAFBNZ has identified a group of risk organisms from the OIE listed diseases to be of particular significance to the Animal Products Industry; due to their potential for harm with differing means of spread and human health concerns.

Refer to Appendix 1 for a table of the OIE listed diseases likely to involve the NZ animal products industry in a response. Profiles have been provided which describe the characteristics, susceptibility to various conditions, recommended treatment and types of disinfectants that should be used to inactivate them.

2.2 OIE, World Organisation for Animal Health

The OIE has the responsibility to assure the sanitary safety of international trade in terrestrial animals and animal products. This is achieved through determining the health measures which must be used by the Veterinary Authorities of importing and exporting countries. This protects against the transfer of potentially pathogenic agents for animals and humans, while avoiding unjustified trade barriers. These measures form the Terrestrial Code. This code has been formally adopted by all OIE Member Country delegates, including New Zealand. The Terrestrial Code is available on the OIE website at: http://www.oie.int/eng/en_index.htm

The OIE have listed pests and diseases of concern in the Terrestrial Code and this can be found at: http://www.oie.int/eng/maladies/en_classification2008.htm?e1d7

These are referred to as “Listed Diseases”. Should there be an incursion of an OIE Listed disease within NZ, it will have significant trade effects until obligations under the OIE Terrestrial Code are met.
2.3 The Economic Consequences

Meat products represent 4% of NZ's GDP and 15% of exports by value, or 26% of NZ's primary sector revenue. The agriculture sector accounts for more than 50% of NZ's total merchandised exports and for 17% of GDP. NZ exports approximately 80% of all food produced. The agriculture and food sectors are also significant employers.

A biosecurity response to a risk organism would lead to trade embargoes on importation of animal products by many overseas countries. It can be assumed that all exports of animal products could cease from the time an initial diagnosis is made. Resumption of normal trade will depend upon the effectiveness of eradication measures and the results of surveillance monitoring. National preparedness and response measures provide a level of confidence to overseas competent authorities in New Zealand's ability to manage these situations, and as such may result in earlier resumption of trade/market access.

The economic consequences of a poorly controlled response would be disastrous.

2.4 Risk Reduction and Contingency Planning

Preparedness and contingency planning will ensure the industry has the ability to respond effectively to a risk organism threat.

A pre-determined response system is needed to give operators and MAFBNZ confidence to manage the event effectively. All Preparedness and Response Plans need to be site-specific and aligned to the operations performed at that site. The operator is therefore the best person/organisation to do this.

2.5 Diagnosis and Confirmation of Risk Organisms

There is a strong possibility the first detection of a risk organism will occur at a processing plant. It is vital for all processing staff to be adequately trained to identify sick animals, recognise signs of disease and know who to notify.

When a suspect risk organism is reported by a processor, the investigation phase commences with the dispatch of a trained Initial Investigation Veterinarian (IIV) to examine the suspect animal(s).

If a risk organism cannot be excluded by the IIV (i.e. a negative diagnosis cannot be confirmed) a second MAFBNZ Veterinarian (Incursion Investigator) with previous field experience will also examine the animals and provide a second opinion. The Incursion Investigator is specially trained and has
experience in diagnosing risk organism diseases. If the Incursion Investigator cannot exclude the risk organism, a response is initiated.

The IIV and Incursion Investigator have powers under the Biosecurity Act 1993 to place the property under a Restricted Place Notice. At this time, operators should activate their Risk Organism Response Plans and follow any directions given by the IIV or Incursion Investigator. A failure to follow a direction given by an Authorised Person is an offence under the Biosecurity Act 1993.

2.6 Special Considerations for the Animal Products Industry

Live animals and animal products have been linked to the spread of disease so it is vital that accurate records are maintained and easily accessible. This enables potentially infected product to be quickly traced from source to final destination.

Many processors send unprocessed product off site for further processing, rendering or other forms of disposal. This may not be possible during a response without further treatment or under strict movement control criteria. This material will require onsite storage until a safe disposal method is identified.

Preparedness planning needs to take all risk factors into consideration consistent with the processing operations at the premises.

3 Technical Operational Requirements

3.1 Purpose

It is important that the processor understands how to manage animals and animal products in a manner that does not place people or animals at risk.

The Risk Organism Response Plan should be site specific and easily understood by people working on that site.

3.2 Scope

The technical requirements cover;
- Movement control
- Site and Personnel control
- Animal and Animal Product collection and transport
- Continuance of operations
- Product identification, segregation, storage and distribution
- Cleaning and sanitising
- Control of waste products and by-products
- Effluent treatment and control
- Product trace-back

3.3  Movement Control

3.3.1  Movement within or through a Declared Controlled Area (CA)

All movement of vehicles, animals and animal products within or out of the CA will require a MAFBNZ movement permit. This is authorised and issued by MAFBNZ and distributed by the ILO/SRO. All processors should be aware of the conditions of the CA notice that apply to them, as these may vary, depending on the organism and the method and extent of spread.

3.3.2  MAFBNZ Movement Permits

The Risk Organism Response Plan needs to clearly state how that site will contact the response centre to inquire about movement permits, and the conditions of the CA notice. The usual link to the response centre is via the NZFAAVA verifier or the delegated SRO responsible for that site. **Contact details for key personnel should be listed in a prominent place.**

A MAFBNZ movement permit is required for any vehicle transporting live animals, animal product or material or effluent into, within or out of the CA.

The movement permit is issued for each vehicle for one 24 hour period and is revalidated for each trip. It should be surrendered at the end of the specified 24 hour period or as directed.
3.4 Site and Personnel Control

3.4.1 Vehicles

All vehicles shall enter and exit the site through controlled access-ways and be restricted to designated areas while on site.

Vehicles used for the collection of stock or the transport of animals, animal product wastes and effluent in the CA are required to have a MAFBNZ movement permit, before movement takes place. Vehicles in transit when a CA is declared should continue to the intended destination.

All vehicles should be checked for the absence of animal residues/soil and cleared for entry or exit to the site. Where there is any perceived risk, vehicles must complete C&D prior to exiting the premises. Refer Appendix 3.

Any vehicles not compliant with movement permit requirements or the criteria in the Risk Organism Response Plan should be notified to the SRO immediately.

Farmers or contractors should not enter the processing premises for any purpose unless this has been permitted, consistent with the CA notice.

3.4.2 Product Moving off Premises and Samples for further Testing

A MAFBNZ movement permit will only be issued to allow products to leave site if they have been ‘treated’ (as outlined in appendix 2) as per the guideline definition and/or packaged securely to prevent leakage or contamination.

3.4.3 Product Waste and Spillage

Raw materials and waste spills must be decontaminated immediately, or contained, collected and treated to eliminate the risk. Untreated effluent and waste shall not be allowed to contaminate storm water drains or the environment.

Raw waste and untreated effluent shall not be fed to any animals or sprayed onto pasture.

Containers for collecting and disposing of rubbish and product waste shall be clearly marked and controlled in accordance with the requirements of the Risk Organism Response Plan procedures or to the satisfaction of the SRO.
3.4.4 Personnel

*Note: It is essential that all personnel are aware of the risks and potential harm of not strictly adhering to the Risk Organism Response Plan procedures and/or any direction given to them by an Authorised Person.*

All personnel should enter and exit the premises through a controlled access way and have their movement onto and off site recorded.

Movement of personnel around the site shall be controlled by use of defined routes and allocated amenities. Movement of personnel to known High risk areas of the site such as yards and waste storage areas should be restricted to those with work responsibilities in these areas.

Entry/exit to all processing areas should be controlled with risk mitigation measures in place. These may include the use of footbaths and/or footwear exchanges. All personnel must adhere to specific decontamination procedures when moving through these areas.

Staff should avoid contact with susceptible farm animals where there is potential for risk organism spread. Staff who own or care for stock should, where possible, make alternative arrangements for them during a response.

*High risk areas:* Personnel working in High risk areas should be restricted from entering areas where treated product is processed or held and shall not leave the High risk areas without decontamination, e.g.: showering and changing all outer clothing and footwear.

*Low risk areas:* Personnel working in these areas, e.g. handling of treated product only, shall shower and change after the initial plant cleaning and sanitising. Thereafter, normal protective clothing and boot exchange procedures should apply.

**Personnel shall not under any circumstance remove animals or animal products from a site without an applicable movement permit.** Personnel, equipment or vehicles may be subject to inspection by an Authorised Person.

3.4.5 Protective and/or Outer Clothing and Footwear

All footwear and protective clothing worn in the High risk areas shall be waterproof and cleaned and sanitised regularly after use, or disposed of in a safe manner.

Waterproof clothing and footwear may be designated to specific areas on the site and used exclusively in those areas.
All protective clothing and/or outer clothing must be cleaned and sanitised in an appropriate manner at the end of every shift, or disposed of in a safe manner.

Systems used for the laundering of protective and/or outer clothing must be adequate to ensure inactivation of the contaminant and prevent cross-contamination between soiled and clean clothing.

### 3.4.6 Amenities

Personnel working in High risk areas should have designated meal facilities, toilets, showers and changing facilities for their exclusive use. These should be separate from amenities used by other personnel on site.

Showers and changing facilities must be adequate to cope with additional demand.

Facilities for collection of used/soiled clothing and footwear shall be adequately controlled to prevent the possibility of cross contamination between clean and soiled clothing.

### 3.4.7 Housekeeping and Pest Control

Good housekeeping standards shall be maintained.

Footbaths or boot exchange areas shall be monitored and maintained to ensure effectiveness.

Air filtration systems shall be maintained.

Drainage systems shall be fully operational.

Pest control systems shall be maintained.

Equipment such as forklifts, trolley jacks, carton trolleys, cleaning items (brushes, brooms) vacuum cleaners and/or hose attachments which are moveable shall be designated to and retained in specific areas or be thoroughly cleaned and sanitised if movement is unavoidable.

All tools (including portable sprayers) used in High risk areas shall be cleaned and sanitised before removal.

### 3.4.8 Use of Contractors

Where contracted services are used for tasks such as cleaning, laundry and rubbish disposal, they must be made aware of the risks and adhere to all site procedures. The site induction process should
take this into account and it should be documented that the contractor has understood their obligations.

3.5 Animal and Animal Product Collection and Transport

3.5.1 Transport of Susceptible Animals and Animal Products

All vehicles used for the collection and transport of susceptible animals and animal products, operating within the CA must carry a valid MAFBNZ movement permit – refer section 3.3.2. Initially, there is likely to be a standstill of all susceptible animal movements within the CA until the extent of the response is known, at which time zoning may be applied.

All risk materials including waste and effluent need to be moved in sealed leak-proof containers to prevent environmental contamination during transport.

3.5.2 Vehicle Cleaning and Sanitising

All surfaces of vehicles used for transport of live animals and untreated animal products should be thoroughly cleaned and disinfected after use. Ideally, this should be done on the premises or at a designated C&D area. It must include all external surfaces, the cab, the stock crate, walkways and wheels, wheel wells and undercarriage. The C&D processes shall follow known time/temperature/pH and chemical combinations to achieve effective outcomes. Refer Appendix 3.

3.5.3 Animal Collection

It is likely that animals will not be collected from Infected and Restricted Places during the initial response phase. Any animals in transit from an IP/RP will need to be identified and isolated on arrival. Disposal of these animals will need to be carefully controlled and must be under the direction of an Authorised Person or SRO.

Principles of separation, movement control and inspection within an operation must be strictly adhered to. Animals for slaughter should not be held for long periods and slaughter capacity should not be exceeded. Animal welfare factors must be adequately managed and the Risk Organism Response Plan should cover these provisions.

The CTO may request intensified inspection of animals as part of disease surveillance. This must be documented.
3.5.4 Farm Stock Control

Farmers must keep other stock well away from the collection yards and off access roads to avoid contamination of vehicles where farm stock are being collected by trucks for processing.

All animal collection must comply with conditions of the MAFBNZ Movement Permit.

Stock should not be collected from an IP/RP unless under direction of the CTO. Vehicles must not enter properties where there is indication that disease is on the property. These should be identified by notices and signs posted under direction of the CTO indicating that a risk organism is suspected/present.

Where collection is necessary from a High risk property, all vehicle occupants must wear full waterproof clothing and complete C&D prior to moving off the property.

3.5.5 Animal Product Control

Strict controls must be in place for animal product processing where there is potential for spread of the risk organism from these products. Movement permits are required for movement from or through a CA, if this is specified in the CA notice. Animal products from infected animals must be traced and segregated. Inventory control is essential and this should meet the minimum requirements of the RMP where applicable. Records must include:

- Source and type of animal material
- Manufacture date and batch identification (where applicable)
- Location and storage information

Additional processing conditions may be set depending on the type of risk organism in accordance with the Risk Organism Response Plan. These could include:

- Product to be held at a defined temperature and time prior to distribution
- Trimming and boning operations strictly controlled to ensure all lymphatic or other tissue is completely removed
- Rendering at specified temperature/time
- Contaminated wrapping material is disposed of appropriately
- Unofficial removal of animal products from the premises shall be strictly prohibited
• C&D procedures are in place as required

• Where additional controls are put in place, they should be adequately documented

• Traceability must be in place for all animal product and animal material processed within the period specified by the CTO.

3.6 Continuation of Operation

This will depend on control measures at the premises and the adequacy of the site Risk Organism Response Plan. It is also dependant on the specific risk organism, particularly if there are human health risks (e.g.: Anthrax). Potentially, in the short term there may not be any permitted movements of susceptible stock and these restrictions may be eased or intensified as the situation is clarified. Slaughter of selected animals may be permitted under supervision depending on the disease. Other considerations for continuance of operations, (in addition to an adequate Risk Organism Response Plan) would include animal welfare factors, and the anticipated length of the response.

Welfare slaughter of animals from unaffected farms in the CA may be necessary during a response that lasts for a long time.

3.7 Production Identification, Segregation, Storage and Distribution

3.7.1 Product Identification

All products must be clearly identified and traceable to their source. For some animal products this may not be possible, so contingency measures must be included in the Risk Organism Response Plan.

Details of processing and parameters must be recorded and easily retrievable.

Contaminated and suspect product must be identified, segregated and held for final disposal as directed by the CTO, potentially under the supervision of an Authorised Person.

Product should be categorised;

• Safe: Product that is deemed free of the risk organism. This includes product that was processed 14 days prior to a response being declared or as stipulated by the CTO.
• **Treated:** Product that complies with specified treatment criteria such as pH, temperature and environmental control requirements for the specific risk organism, as defined by the OIE and/or CTO.

• **Suspect or Untreated:** Product processed before the implementation of the risk organism management strategies. This includes all products processed up to 14 days prior to a response being declared or as stipulated by the CTO.

### 3.7.2 Product Segregation and Storage

All treated, untreated and safe products shall be clearly identified and segregated throughout processing and storage.

### 3.7.3 Product Distribution

All products processed within the CA intended for distribution or transfer will require a MAFBNZ movement permit. Only products which comply with the requirements for treated or safe product will be permitted for distribution outside the CA unless otherwise approved by the CTO, e.g.: where storage is limited and product needs to be transferred to storage outside the CA.

### 3.8 Cleaning and Disinfection Requirements

Only cleaning chemicals and sanitisers detailed in Appendix 3 shall be used as disinfectants during a response unless otherwise directed by an Authorised Person.

As some risk organisms are highly contagious, the importance of cleaning and sanitising cannot be over-emphasised.

Accurate control of the concentration of the sanitising agent is essential to ensure maximum efficacy.

#### 3.8.1 Effective Sanitisers

The pH, concentration, contact time and temperature are important to ensure effectiveness against the specific risk organism.

Appendix 3 specifies sanitiser types and instructions for use.
3.8.2 Sanitising Procedure

Sanitising procedures must be carried out systematically to completely deactivate the risk organism. Often this will require a three step process of:

a. Preliminary disinfection; the aim of this is to rapidly reduce the amount and distribution of risk organism on the premises up to the time of completion of slaughter and disposal, when a more thorough disinfection can be completed.

b. Preliminary cleanup; the aim of this is to remove all organic matter in a safe manner. This includes the removal of things such as manure, dirt, meat scraps and contaminated packaging material etc.

c. Full disinfection; the aim of which is to deactivate the risk organism using physical and chemical agents, these may be organism specific. It is important to ensure that optimum pH, concentrations and contact times are maintained during this operation.

In sanitising a building, the recommended order of cleaning is roof to walls to floor. Throughout the operation, runoff should be contained within the premises to avoid contamination of the surrounding environment or rainwater systems etc.

The response plan needs to address all areas including:

1. Stock yards and holding areas

2. Processing areas and work surfaces

3. Stock vehicles and equipment used for transporting stock

4. Spillage of risk product

5. Waste storage areas

6. Foot wear and protective clothing

7. Changing areas

8. Waterproof clothing

9. Samples for laboratory testing and associated sample collection materials

10. Product moving off premises for further processing (under permit where required)
3.9 Control of Waste Products and By-Products

3.9.1 Special Considerations

Many operators send waste and effluent off site for further processing or disposal. The risk from these products needs to be assessed and managed appropriately. At the start of a response there is a possibility these products may have been sourced from an IP or from within a CA. These products must not be moved off site and should be held until their potential risk can be assessed. Where product has already left the site and is in transit, this must be notified as soon as possible to the SRO and the receiving operator. These products must be moved in sealed leak proof containers in compliance with current legislative requirements.

After declaration of a Risk Organism Response, all movements of these types of product will be subject to Movement Permit requirements and must comply with the conditions of these permits.

Movement of animal product waste and effluent off site is considered a significant pathway for spread of the risk organism; therefore, these operations require careful planning and a high degree of control.

3.9.2 Product for Rendering

Rendering parameters must be sufficient to ensure deactivation of the risk organism. MAFBNZ has determined that where possible, rendering is the preferred method of disposal of risk product. Rendering results in a more environmentally friendly disposal method and a safe end product.

However, most of NZ’s rendering operations do not meet EU requirements for destruction of TSEs. The CTO will specify the intensified regimes if required, according to the specific risk organism.

All products designated for rendering requires accurate inventory control to allow traceability to the original source of the animal. Records must be kept for verification of processing parameters.

3.9.3 Hides and Skins

Hides and skins can become contaminated and provide a source of the risk organism, particularly if left unprocessed. Hides and skins may require special deactivation treatments prior to leaving an operation, or be transported subject to additional conditions on the movement permit.

Records must be kept for all products to allow traceability to the original source.
3.10 Effluent Treatment and Control

3.10.1 Effluent Systems

The type of effluent and effluent system needs to be considered when deciding if effluent will require further treatment. This analysis should be done as part of response plan development. Where there is any doubt whether or not additional treatment is required, the situation should be discussed with the SRO or referred to the MAFBNZ Response Centre.

3.10.2 Low risk Effluent Control

The following processing and effluent control situations are considered Low risk and may be exempt from the requirements for further treatment. Where there is any doubt, the operator should contact the SRO prior to any effluent discharge taking place.

- Effluent that is discharged directly into a municipal sewer or through enclosed pipes to the sea
- Waste derived from treated product can be classified as Low risk as a result of treatment
- Effluent that is subject to very high or low pH streams and is not mixed with effluent from High risk areas, and records verify consistent compliance with pH ranges.
- Effluent that is proven to contain less than 0.05% blood or High risk product and the diluents are considered Low risk.
- Or a combination of the above situations providing they have been assessed as Low risk by the Recognised Agency as part of the Risk Organism Response Plan verification.

3.10.3 Effluent and Waste Disposal and Treatment Requirements

The nature and origin of waste should be pre-determined so that controlled treatments can be applied quickly. Treatments may vary slightly according to the specific risk organism. Unless deemed to be Low risk, as above, the following should apply:

- All effluent treatment areas are considered High risk and access shall be controlled and restricted to designated personnel only.
- Washings from High risk areas should be directed to the effluent system and contained for treatment prior to disposal.
• Liquid effluent from all areas where untreated product is held should be treated appropriately prior to release.

• The pH of waste streams must be monitored continuously during a Risk Organism Response to verify required parameters are met.

• Water and cooling water that could be contaminated by raw material or aerosols should be diverted to effluent treatment.

• Effluent sampling should be stopped unless required for pH monitoring.

• Untreated effluent (including blood) should not be sprayed directly onto pasture unless direction is given by an authorised person. Susceptible animals must not be allowed to graze sprayed pasture for a period specified by the CTO. If stock cannot be kept off these areas, pasture must not receive effluent. Spray irrigation equipment must not be moved unless under a movement permit.

• Movement permits are required for transport of effluent, or waste within, or out of the CA.

• Treatment and disposal of effluent and waste must be managed in accordance with the Risk Organism Response Plan.

3.10.4 Movement Permit Conditions for Transporting Effluent and Waste

The following applies:

• The effluent and waste products must be managed consistent with the site Risk Organism Response Plan.

• Vehicles and equipment shall be subject to C&D between trips.

• Drivers must be provided with waterproof clothing and must complete self-C&D procedures between premises, whether or not they believe they may have come into contact with risk materials.

• All waste shall be sealed in leak-proof containers and any accidental spillage must be fully contained and cleaned up.

• No risk product is moved from or through a Controlled Area without a MAFBNZ Movement permit.
3.11 Trace-back

The importance of being able to trace all risk products is critical to the management of the response. This is required to identify all possible routes which the risk organism has potentially spread. Trace-back covers all aspects of processing, from stock collection to distribution and storage of finished products. This may be required for up to 14 days prior to the response being declared or as many days as declared by the CTO.

Records must include:

a. The source of livestock and animal products
   This includes all Animal Status Declaration (ASD) records

b. Any inter-transfer between operators and/or processors
   Live animals, meat or meat products, effluent and waste products

c. Product distribution
   A list of all processed products that have left the site, their destination and transport details, including product for further processing

d. Any samples sent for testing or as trade samples etc
   A record of all samples that have been dispatched, their destination and method of disposal

e. All company staff
   A record of the names and residential addresses of all staff, both permanent and casual. This should also include a record of any staff who own, keep or are in contact with susceptible animals

f. Effluent and waste disposal
   A record of all premises visited by effluent disposal trucks, dates, delivery sequence and drivers

g. Any livestock farmers who have visited a processing premises

This information must be readily available during a response. Most of these records should be routinely kept, consistent with the traceability requirements of an RMP.
4 Animal Products Risk Organism Response Planning

4.1 Purpose

This section outlines how an operator should plan to effectively manage a Risk Organism Response on their site. They need to maintain a state of preparedness and be ready to implement a response plan quickly.

4.2 Scope

The site Risk Organism Response Plan should cover the following activities:

- Site and Personnel control
- All aspects of animal product processing
- Movement Control
- Control of samples
- Inventory Control from source to final distribution
- Product identification, storage and segregation
- Management/Disposal of Risk Products
- Decontamination – C&D requirements
- Effluent and waste products treatment and disposal
- Traceback

4.3 Risk Organism Response Plan Preparation

A template is available to assist with the development of site response plans. These may be obtained from the NZFSA website or though your NZFSAVA verifier.
Typical Response Management Plan Outline.

The plan should be site specific and specify the following:

4.4 Name of Operation

This includes location and contact details and persons responsible for operating the plan.

4.5 Site Characteristics

Including:

- 4.5.1 - Type and capacity of processing
- 4.5.2 - Reception of incoming stock and/or product
- 4.5.3 - Processing Systems
- 4.5.4 - Storage and Distribution of animals/products
- 4.5.5 - By-Products, waste and effluent control

4.6 Organisational Structure and Lines of Communication

Including:

- 4.6.1 - Company personnel with responsibility for Risk Organism Response Planning and implementation
- 4.6.2 - Training programmes and training records
- 4.6.3 - Identification of NZFSA, MAFBNZ and other organisations with liaison roles and their contact details including SROs and ILOs
- 4.6.4 - Notification of possible risk organisms including of the MAFBNZ Risk Organism Hotline number; 0800 80 99 66
4.7 Risk Organism and Response

Including:

- 4.7.1 - Isolation of Stock and Risk Products
- 4.7.2 - Cessation and/continuation of production and processing
- 4.7.3 - Animal Welfare
- 4.7.4 - Identification of risk product
- 4.7.5 - MAFBNZ Movement permitting
- 4.7.6 - Possible risk organism exposure pathways
- 4.7.7 - Product Trace-back
- 4.7.8 - C&D procedures
- 4.7.8.1 - Personnel
- 4.7.8.2 - Equipment
- 4.7.8.3 - Vehicles
- 4.7.8.4 - Protective Clothing and Safety Equipment
- 4.7.9 - Specialised treatment for Risk Product
- 4.7.10 - Waste and effluent control
- 4.7.11 - Vermin and Vector controls
- 4.7.12 - Inventory Control
- 4.7.13 - Trade Requirements

This list should be used as a guide. Operators may consult their RA Verifier during the development of their Plan to make sure that all necessary factors have been considered for their operation.
5 Animal Product Industry Responsibilities

In the event of a biosecurity response, a Recognised Agency ILO will request processing sites within the CA to immediately implement their Risk Organism Response Plan procedures.

The processing site designated representative should liaise directly with the SRO to co-ordinate the implementation of the Risk Organism Response Plan and provide any information requested to assist with the response.

Processing premises not able to meet the outcomes of their plan, or those that do not have a current plan may be ordered to cease processing.

During a biosecurity response, the Animal Products industry has a responsibility to fully comply with any direction given by an Authorised Person.

5.1 API Preparation for a Response

Animal product processors should allocate personnel for the following activities:

- Co-ordinate the development and maintenance of the site Risk Organism Response Plan
- Identify key personnel and resources needed to implement procedures.
- Co-ordinate staff training and familiarisation with the site Response Plan and SRO responsibilities
- Co-ordinate the documentation and maintenance of records to assist with the tracing and verification of animals and product from point of entry, through processing, storage and distribution
- Liaison with the RA to facilitate the verification of the plan and associated procedures
- Reporting of site preparedness status to company management

Risk Organism Response Plans, including documented procedures, details of training and resources, must be verified by the RA to ensure that requirements and obligations can be implemented effectively during a response.

5.2 API Responsibilities during a Response

During a response, processors that have received infected animals/product will be contacted by the RA and directed to implement their Risk Organism Response Plan immediately. Where operators are
aware that a response has been initiated in their area and are not contacted directly, they should proceed with implementing their response plan and contact their ILO or SRO to request further advice.

The API processor shall follow instructions from their ILO or SRO and meet their obligations to:

- Control their site and personnel
- Appoint a site co-ordinator to implement the response plan as directed by the SRO
- Communicate with the Response Centre through their SRO and ILO,
- Notify any suspect cases of a risk organism to the 0800 number – 0800 80 99 66
- Comply with all directions given by Authorised Persons
- Control the destruction and disposal of animals and/or animal products, consistent with procedures in the response plan.
- Perform C&D consistent with procedures in the response plan or as directed by the SRO
- Ensure the security and safe storage of animals and animal products.
- Segregate and secure product where directed
- Maintain inventory control of products processed during a response
- Provide information in on product in storage and transfer within NZ for 14 days (or as specified by the CTO) prior to the response being declared

The API processing Site Response Co-ordinator must liaise closely with the SRO to provide all the information requested and implement any additional conditions due to the nature of the response.

5.3 Exporter Responsibilities

NZFSA will notify operators with details of responses likely to affect trade.

Exporters will be requested to provide the following information;

- Product in storage and transfer within NZ for 14 days (or as specified by the CTO) prior to the response being declared
- Exported product including departure dates, vessel/voyage numbers, port of loading and destination
Exporters will be advised of response progress via NZFSA. Recertification may be possible if the health status of NZ is amended on the official assurance.

6 NZFSA and MAFBNZ (Responsibilities during a Biosecurity Response)

6.1 Preparation

MAFBNZ and NZFSA provide guidance material for the establishment of processing site Risk Organism Response Plans in consultation with appropriate industry groups. Under the Biosecurity Act 1993 the CTO is provided with the powers necessary to direct the response activities. The MAFBNZ Incursion Investigation Team is responsible for investigation of any suspect risk organisms notified through the Disease and Pest Hotline: 0800 80 99 66.

6.2 MAFBNZ Response Centre

During a biosecurity response, the Response Centre is established at an appropriate location. The response can be scaled up if necessary to an all-of-government response operating under a CIMS-type structure for a high priority risk organism or that of economic significance. An all-of-government response involves multiple government agencies.

6.3 NZFSA Response Centre

NZFSA will establish an operational centre at head office in Wellington. This is for the purpose of direct liaison with the ILOs, importing country authorities, NZFSAVA Certification offices, Industry Groups and all manufacturers and exporters.
6.4 Response

6.4.1 Investigation and Diagnosis

Reporting a suspect case of a risk organism will initiate immediate dispatch of a trained IIV to examine the suspect animal/s.

If a risk organism cannot be excluded, a second MAFBNZ Veterinarian, an Incursion Investigator will also examine the animal/s and provide a second opinion.

If the Incursion Investigator cannot exclude the risk organism, MAFBNZ may initiate eradication or disease mitigation procedures specific to the organism.

6.4.2 Confirmation

Depending on the suspected risk organism, samples may be sent to a World Reference Laboratory in the United Kingdom for confirmation. In the intervening period, implementation of full eradication procedures may be necessary to ensure containment of the disease, particularly if a vesicular disease is suspected.

6.5 The Recognised Agency

The RA verifies Risk Organism Response Plans.

The RA assists the Animal Products Industry with preparedness as well as during a Risk Organism Response.

Responsibilities include:

- Maintenance of a current register of Animal Product Industry processors including contact details and emergency liaison personnel at each premises.
- Verification of Risk Organism Response Plans to confirm they meet specified outcomes.
- Reporting to NZFSA on the status of industry preparedness.
- Develop and participate in training activities to ensure competency.
- Give advice to industry which assists them to develop and implement Risk Organism Response Plans, including preparation of plan templates.
The Role of the ILO includes:

- Assignment of SROs to animal product processing sites during a response.
- Maintenance of communications, including regular reporting with SROs and the MAFBNZ and NZFSA Response Centres during a response.
- Have knowledge of status of available resources and expertise within industry and how to employ these during a biosecurity response.

The Role of the SRO: SROs will be assigned to significant Animal Product Processing sites during a response. Their role includes:

- Liaise closely with the site management team and act as the MAFBNZ and NZFSA contact on site.
- Exercise powers as an Authorised Person under the Biosecurity Act 1993 or an Animal Products Officer under the Animal Products Act 1999 where this is deemed necessary.
- Monitor and verify the implementation of Risk Organism Response Plans and procedures.
- Report to ILOs on progress on implementation of Response Plans and procedures and identify any risks and issues. Communicate instructions for specific actions requested by the ILO.
7 Appendix 1 - OIE Listed Diseases of Concern to the NZ Meat Industry

Note; This list includes additional species to sheep, goats, cattle and deer so processors of other species can give consideration to disease risks specific to their operation, for example those operators who process horses or ostrich.

Multiple species diseases;
- Anthrax ¹
- Aujeszky's disease
- Bluetongue
- Brucellosis (Brucella abortus, Brucella melitensis, Brucella suis) ¹
- Echinococcosis/hydatidosis ¹
- Foot and mouth disease
- Japanese encephalitis (West Nile Fever) ²
- Leptospirosis ¹
- Q fever ¹, ²
- Rabies ¹
- Rift Valley fever ¹
- Rinderpest
- Trichinellosis ¹
- Tularemia ¹, ²
- Vesicular Stomatitis

Sheep and goat diseases;
- Contagious caprine pleuropneumonia
- Maedi-visna
- Peste des petits ruminants
- Scrapie
- Sheep pox and goat pox

**Swine diseases;**
- African swine fever
- Classical swine fever
  - Nipah virus encephalitis
- Swine vesicular disease

**Cattle diseases;**
- Bovine spongiform encephalopathy
- Bovine tuberculosis
- Contagious bovine pleuropneumonia
- Haemorrhagic septicaemia
- Lumpy skin disease
- Theileriosis (exotic stains)

**Deer Disease;**
- Chronic Wasting Disease

**Equine diseases;**
- Equine encephalomyelitis (Eastern)
- Equine encephalomyelitis (Western)
- Surra (*Trypanosoma evansi*)
- Venezuelan equine encephalomyelitis
Other diseases;

- Leishmaniosis $^{1, 2}$

Key:

1. Zoonotic
2. Insect and Vector borne
3. Only of concern to hides and skins

Those diseases not outlined in this section, please refer to OIE.

7.1 Specific Risk Organism Information

Links to disease specific information:

Office International des Epizooties - OIE - The World Organisation for Animal Health

http://www.oie.int/eng/en_index.htm

United Kingdom Department for Environment, Food and Rural Affairs (DEFRA)


Iowa State University

http://www.cfsph.iastate.edu/DiseaseInfo/animaldiseaseindex.htm

Foot-and Mouth Disease (FMD);

Foot and Mouth Disease (FMD) is a highly contagious viral disease which affects cloven-hoofed animals such as sheep, cattle, pigs, goats, llamas and deer. It can be spread by saliva, mucous, milk, faeces and can be carried on wool, hair, grass, footwear, clothing, livestock equipment and vehicle tyres. It can also spread quickly over long distances by wind. The virus likes damp, cool conditions and is easily spread when animals are penned up. It does not like warmth and humidity, but in the right conditions has been shown capable of surviving several weeks in the soil, or on glass, sheep wool or cattle hair.

Clinical signs of the disease vary between species, but blisters on the nose, mouth and feet are consistent. Animals stop eating, become depressed and lame and salivate a lot. There is no cure.
Movement of animals and animal products;
FMD can be spread by movement of animals, raw animal products from affected animals and by faeces and other discharges from infected animals. It can also be spread by people and their clothing contaminated with the virus, or virus contaminated vehicles (fomites).

Movement of vehicles that have carried animals and animal products;
To prevent spread of virus it is important to wash and disinfect vehicles that carry animals and raw animal products. Care must be taken to make certain contaminated vehicles do not leave site and go to farms where they may infect stock.

Movement of people;
FMD virus can be spread by people that have worked with infected animals or animal products. The amount of virus needed to cause infection is very small, and the clothing worn by people working with affected animals must be treated as contaminated. Personnel at animal processing sites should wash/shower and change their clothing before leaving the site. Staff who farm susceptible animals must be particularly vigilant when leaving the premises and should consider establishing alternative means of caring for their animals.

Human health risk;
FMD virus is not a cause of disease in humans, so normal OSH precautions regarding working with animals and equipment apply when working with affected animals.

Effective disinfectants;
There are a number of commercial disinfectants that are effective against the FMD virus including Virkon®. Other effective compounds include 2% Sodium Hydroxide, 4% Sodium Carbonate and 0.2% Citric Acid. Care should be taken when handling these compounds as some are corrosive.

7.1.1 Swine Vesicular Disease

A viral infection of pigs characterised by fever and lameness, due to vesicles and lesions on the feet and around the mouth. Signs include vesicles and erosions on snout, mammary glands, coronary band of the hoof and between the toes. There is recovery after 2-3 weeks with little permanent damage and mortality is lower than for FMD. These signs are indistinguishable from FMD, therefore laboratory confirmation is necessary.

- Species Affected; Pigs are the only species that are affected.

Movement of animals and animal products;
This virus is transmitted by the ingestion of contaminated meat, as well as direct contact between
infected animals and in contaminated faeces etc. Movement controls on pig products will therefore be put in place and will be similar to those applied for FMD.

**Movement of vehicles that have carried animals and animal products;**
Similar controls to FMD. To prevent spread of virus it is important to thoroughly clean and disinfect vehicles that carry animals and raw animal products. Care must be taken to ensure contaminated vehicles do not leave the premises and go to farms or stockyards.

**Movement of people;**
This virus can be spread by people that have worked with infected animals or animal products. Clothing worn by people working with affected animals must be treated as contaminated. Personnel at animal processing sites must wash/shower and change their clothing before leaving the site. Staff who farm susceptible animals must be particularly vigilant when leaving the premises and should consider establishing alternative means of caring for their animals.

**Human health risk;**
Laboratory staff working with the virus are known to have become infected, although Swine Vesicular Disease virus is not highly contagious to humans. Normal OSH precautions apply when working with infected animals and animal products.

**Effective Disinfection;**
1% Sodium Hydroxide combined with a detergent is effective in the presence of organic matter. Oxidising agents and iodophors used with detergents work well for personal disinfection in the absence of organic matter.

### 7.1.1.1 Rinderpest, Cattle Plague

This is an acute highly contagious viral disease of cloven hooves animals especially cattle, causing high fever, nasal and eye discharge, laboured breathing, severe often bloody diarrhoea and high death rates. The initial signs can be similar to FMD. Oral erosions, high fever, congested mucous membranes and death in 2-3 days in young animals. Diarrhoea, abdominal pain and death after 8-12 days in adult animals. Signs are less severe in sheep and goats. Pigs may have conjunctivitis and oral lesions followed by death.

**Species Affected;**
Most cloven hoofed animals are susceptible to varying degrees. Domestic cattle, water buffalo are particularly susceptible.

**Movement of animals and animal products;**
The virus can survive for long periods of time in chilled or frozen products and is spread by direct or
close indirect contact between susceptible animals especially in the faeces and other animal discharges. Movement control should be similar to those for FMD. Animals may be infectious for up to 48hrs prior to showing signs of the disease.

**Movement of vehicles that have carried animals and animal products;**
Similar controls as for FMD. To prevent spread of virus it is important to wash and disinfect vehicles that carry animals and raw animal products.

**Human health risk;**
Rinderpest has not been reported to affect humans. Normal OSH precautions regarding working with affected animals and animal products apply.

**Effective Disinfection;**
Susceptible to most common disinfectants. Is deactivated by UV radiation and is susceptible to drying.

### 7.1.1.2 Peste des Petite Ruminants (PPR)

PPR affects sheep and goats with signs similar to rinderpest in cattle, and is characterised by fever, enteritis with a high mortality rate. It is closely related to rinderpest. Signs include, fever, mouth and tongue lesions, nasal and eye discharge, conjunctivitis, gastro enteritis, pneumonia with coughing and abortions.

**Species Affected;**
Primarily a disease of sheep and goats. Cattle and pigs can be infected but do not transmit infection.

**Movement of animals and animal products;**
As for those recommended for other vesicular diseases.

**Movement of vehicles that have carried animals and animal products;**
As for other vesicular diseases.

**Human health risk;**
There are no human health concerns. Normal OSH requirements for the handling of affected animals and animal products apply.
Effective Disinfection;

PPR virus does not survive well in the environment and is killed by most of the common disinfectants as well as alcohol, ether and detergents. Can survive for long periods of time in chilled and frozen tissue.

7.1.2 Transmissible Spongiform Encephalopathy (TSE)

TSEs are progressive and fatal neurodegenerative (nervous) diseases of animals. These diseases were once thought to be entirely species specific but it now appears that some agents can cross species. They are largely untreatable.

TSEs are characterised by having long incubation periods (in terms of years) before animals start showing symptoms so are generally considered diseases of adult animals. The causative agent is a protein particle referred to as a prion, which are extremely resistant to treatments that ordinarily destroy viruses. In many cases the precise way these diseases spread is not fully understood. Animals suspected of having TSEs should be destroyed and should not be allowed to enter the animal products food chain for either human consumption or animal consumption.

Prions are not destroyed by routine rendering methods. EU specifications for BSE animals require rendered product to be treated at 133°C for 20 minutes and 3 bars pressure. Few operators can meet this standard so disposal of infected animals must be strictly controlled.

Currently NZ is free of the major TSEs of concern.

7.1.2.1 Bovine Spongiform Encephalopathy (BSE), Mad Cow Disease

BSE is a progressive neurological degenerative disease of adult cattle affecting the brain with a long incubation period. Signs include abnormal gait and posture, trembling, hyper excitement and violent behaviour, heightened sensory perception, loss of body weight but no loss of appetite. Progressing through recumbence to death.

Overseas outbreaks have been linked to changes in rendering practices and the feeding of ruminant meat and bone meal to cattle. NZ has a prohibition on feeding ruminant protein to farm animals.

Diagnosis can be difficult and relies on analysis of brain tissue. Where this disease is suspected it is important that the intact brain is available for testing.
Transmission;

This is still an area of debate but evidence suggests that BSE is transmitted orally. In infected cattle the agent has only been detected in the brain, spinal cord and the retina. These products are identified as High risk materials and restrictions on their collection and use are in place. Offspring of infected cattle are at an increased risk of developing BSE. Incubation is unusually long with a peak incidence in 4-5 year old cattle.

Movement Controls;

Movement control would be established for cattle and cattle products. BSE is not carried by humans or cattle faeces and other discharges; therefore less emphasis would be placed on cleaning and disinfection of people or vehicles. The long incubation period for BSE means that product trace back and inventory control will be important and will require historical records to be checked. Emphasis should be placed on making certain High risk products such as nervous tissue do not get into the feed chain.

Human Health Risk;

BSE is not considered a serious health risk provided adequate protective measures are taken while handling risk materials and slaughtering infected animals. The disease has been associated with variant Creutzfeldt-Jakob disease (vCJD) in people as the result of direct ingestion of contaminated animal products.

7.1.2.2 Chronic Wasting Disease (CWD)

CWD is a disease of cervine animals (deer), resulting in ill-thrift and death. A number of types of deer can be infected including elk (wapiti), mule deer, white tail deer and black tailed deer. Like other TSEs CWD does not respond to treatment. Signs include progressive weight loss and lassitude over an extended period of time (several weeks to months), excessive salivation and tooth grinding, nervous signs may occur but are less marked than with BSE, severe emaciation and death. Diagnosis is based on the histological findings in the brain.

Transmission;

The method of transmission of CWD remains unknown. Vertical and oral transmission routes have been suggested.

Movement Controls;

Movement controls would be put in place for the movement of deer and High risk deer products and trace-back of product will be required.
**Human Health Risk;**

CWD is not considered to be a human health risk.

**7.1.2.3 Scrapie**

Scrapie occurs in sheep and goats with infection most commonly passed from ewe to lamb, there can also be lateral spread when lambing occurs in a confined area. Like other TSE’s Scrapie has a prolonged incubation period, usually in the order of 1-3 years. Clinical signs include itchy skin and wool loss, lack of co-ordination, trembling and convulsions, depression and loss of condition, recumbence and death. Mortality rates vary but can be up to 20%. Certain breeds of sheep appear to have a genetic predisposition. Most die within 2-6 weeks of the onset of symptoms.

The scrapie agent has been isolated from a number of tissues including, placenta, tonsils, intestine, and the nervous system. Lateral spread between animals by direct contact can occur. Fomites (such as knives, surgical equipment) may also have a role so care has to be taken with hygiene at vaccination times and processing equipment must be carefully cleaned.

**Movement Controls;**

Movement controls would be put in place for the movement of sheep and goats and their products. This would include slaughter of infected and High risk animals, the disposal of High risk tissues involved with transmission of scrapie, and limiting the spread between susceptible animals.

**Human Health Risks;**

There are no human health concerns with Scrapie.

**Effective Disinfection for TSEs;**

All the TSEs agents are highly resistant to disinfectants, heat, UV radiation, ionizing radiation and formalin. Effective disinfection by autoclaving is possible (138°C for 18 mins). Animal product should be rendered using high pressure high temperature systems. Sodium Hypochlorite contain 2% available chlorine or 2 N Sodium Hydroxide are effective provided they are applied for at least 1 hour at 20°C (**Warning these chemicals are extremely hazardous**). Overnight disinfection of equipment is recommended.

**Public Health Issue with TSEs;**

There is no evidence that Scrapie or CWD can be transferred to humans. In humans vCJD has been linked with BSE, this is a fatal progressive encephalopathy for which currently there is no treatment.
Caution must be taken therefore when dealing with and slaughtering suspect TSE animals. Special stunning requirements for animals may have to be implemented.

7.1.3 Anthrax

Anthrax is a bacterial disease which can cause very high mortality rates in ruminants. It is also zoonotic and can be fatal in humans as well as animals. Clinical signs in animals can vary due to susceptibility and route of infection. Anthrax is a spore forming bacteria and spores can survive in the environment for long periods of time (decades). Clinical signs tend to develop very quickly often over a matter of hours and can include sudden death, with bloody discharge from nose and anus, fever, disorientation, muscle tremors, dyspnea, congested mucus membranes and convulsions and collapse.

**Where anthrax is suspected, animals should not be processed or a post-mortem carried out in the field because of the risk of release of spores into the environment.** Diagnosis can usually be made from a blood smear or from the discharge from the animal. (Full protective measures should be taken when collecting samples). Other species such as pigs, cats and dogs can be affected often with gastric signs.

**Movement Controls;**

Movement control would be put in place for susceptible animals from the infected area. Animals do not become infective until they show signs of the disease, and are most commonly affected by the ingestion of spores on contaminated pasture or feed supplement. Disposal of carcasses must be carefully controlled for infected animals.

**Movement of vehicles that have carried animals and animal products;**

Vehicles that have been used for the transport of suspect anthrax infected animals, carcasses or animal products would require specialised cleaning to eliminate the risk of spread of infective spores.

**Human Health Risks;**

There are public health concerns. Human infection is frequently caused by exposure of open wounds to infected animals and animal products, it is therefore important to wear gloves and adequate protective clothing when handling suspect animals, or working in a contaminated area. 10-20% of human cutaneous infections are potentially fatal. Aerosol spread, especially during cleaning should be considered and specialised protective equipment should be made available.

**Effective Disinfection;**

Destroyed by 5-10% formaldehyde. Chloride solutions must be very strong to eliminate anthrax spores. Carcasses should be incinerated or high temp rendered, they should not be buried.
7.1.4 Salmonellosis, Bacterial and Viral other Enteritis

Most food producers are aware of the risks of these types of infection because of their food safety risks and will have risk management measures in place. There are a number of infections that are considered to be risk organisms where notification of the Regulatory Authorities and controls measures are required. These include;

Transmissible Gastroenteritis (TGE) in Pigs;

This is a viral infection of pigs caused by a corona virus which is resistant to freezing. It is characterised by profuse diarrhoea in young piglets with dehydration and death. The virus is destroyed by heat (cooking) but is resistant to acidification. Its survival in salted and dried meats is unknown.

Salmonella Abortusovis;

This is an infection of sheep causing abortion storms. It is thought to be reasonably host specific unlike many other forms of Salmonella. Spread is thought to be via direct contact. Unlike other forms of Salmonella, diarrhoea is not a predominant feature, though it may be seen in young lambs prior to death.

Salmonella Abortusovis does not appear to be a significant human health threat as compared to some other Salmonella species, however routine hygiene precautions should be taken.

Movement Controls;

Movement controls would be put in place to minimise the risk of spread. There may also be requirements for recall of product and specialised cleaning and disinfection procedures.

Human Health Risk;

Due to the human health risks associated with these types of diseases, personal hygiene becomes a priority. Contaminated clothing should not be worn off the premises and an effective disinfectant scrub should be used. Where these types of risk organisms are suspected, Regional Health Authorities will be notified.

Effective Disinfection;

Susceptible to disinfectants that are effective against other Salmonella, including 1% Sodium Hypochlorite, 70% Ethanol, 2% Glutaraldehyde, iodine compounds, phenolics and formaldehyde. Salmonella species are susceptible to moist heat (121°C for 15 mins) or dry heat (160-170°C for 1 hour).
7.1.5 Classical Swine Fever (CSF) Hog Cholera

This is a highly contagious viral disease of pigs which spreads rapidly. It is characterised by high fever, depression, multiple haemorrhage and rapid death. Diagnosis can be difficult because of the low grade non-specific symptoms and similarities to other diseases. Purple discoloration around abdomen, inner thighs and ears may develop after several days. Deaths usually start after 1-2 weeks; chronic cases are almost always fatal. May also cause abortion, still births and mummification of the foetus.

Spread is mainly by the oral route and is associated with feeding of uncooked swill. It does not spread long distances in the air but there may be aerosol spread in confined areas. Mechanical spread by insects or fomites can occur. The virus is moderately fragile in the environment although it may remain viable for up to 2 weeks. The virus remains infective for long periods in chilled or frozen pork products.

**Species Affected:** Domestic and wild pigs

**Movement Controls:**

Movement controls should be put in place and infected animals be slaughtered. Premises would be quarantined and cleaning and disinfection procedures implemented. Contaminated bedding etc would require specialised disposal.

**Human Health Risk:**

Classical Swine Fever does not affect humans.

**Effective Disinfection:**

The virus is sensitive to drying and UV radiation and is rapidly inactivated by a pH of less than 3. It is sensitive to heat and destroyed by cooking. Sodium hypochlorite and phenolic compounds are effective disinfectants.

7.1.6 Porcine Reproductive and Respiratory Syndrome (PRRS)

This is a viral disease of pigs that causes reproductive failure in adult sows and respiratory tract illness in young pigs. Signs are often variable and non-specific including pneumonia, poor reproductive performance, abortion and loss of appetite. Occasionally skin lesions are seen that may be similar to FMD. In China it is referred to a Blue Ear Disease.

**Species Affected:** Pigs.
Movement Controls;

This condition is of great concern to the domestic pig industry. Movement controls will be put in place and infected piggeries would be quarantined. Control would be based on slaughter and quarantine procedures. Thorough cleaning and disinfection of vehicles and people in contact with pigs must be completed. Specialised cleaning and disinfection procedures would need to be put in place at premises where infected pigs are processed. It is critical that contaminated pig products are not fed back to pigs.

Human Health Risks;

PPRS is not considered a human health risk.

Effective Disinfection;

This virus is reasonably fragile in the environment and is unstable at pH less than 5 or greater than 8. It survives longer in a frozen rather than chilled state. Is heat sensitive, 20 minutes at 56°C is sufficient for destruction. Should be susceptible to most of the common disinfectants.

7.1.7 Japanese Encephalitis

This is a mosquito-borne viral infection of pigs, humans and horses. In pigs it mainly causes reproductive failure; it can cause fatal encephalitis in humans and horses. It may also infect cattle, reptiles and birds which can act as carriers. Signs of infection in pigs include birth of stillborn and mummified foetuses near full term, pigs born alive with a tremor and then develop convulsions and die. The mortality rate is very high in piglets born to infected sows but close to zero in adult pigs.

In horses it causes fever and nervous signs often with teeth grinding and sometimes blindness.

Species Affected; Pigs, horses.

Movement Controls;

Movement restrictions will be aimed at limiting the virus to a defined area and stopping movement of horses and pigs from the infection zone. Vector control procedures may be implemented against mosquitoes including the use of insecticides.

Human Health Risk;

There is minimal risk for people working directly with infected animals and normal OSH considerations apply. People working in the infection zone should take precautions against being bitten by mosquitoes.
Effective Disinfection;

The virus is inactivated by, 70% ethanol, 2% glutaraldehyde, 3-8% formaldehyde, 1% sodium hypochlorite, iodine, phenolics and organic solvents. The virus is sensitive to heat, drying and UV radiation.
## 8 Appendix 2 – Specific AP Treatments and Risk Organism Information

Risk Organisms of significance to the New Zealand Animal Products Industry (excluding dairy).

Inactivation treatments mentioned in Appendix 2 may be subject to change on advice from the CTO.

<table>
<thead>
<tr>
<th>Name of disease and species affected</th>
<th>Present in unprocessed meat products</th>
<th>Present in Hides &amp; Skins</th>
<th>Treatments to inactivate disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot and mouth disease</td>
<td>yes</td>
<td>yes</td>
<td>Animal Products:</td>
</tr>
<tr>
<td>All cloven hoofed animals (Ungulates)</td>
<td></td>
<td></td>
<td>Canning:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meat is subjected to heat treatment in a hermetically sealed container to reach an internal core temperature of at least 70°C for a minimum of 30 minutes or to any equivalent treatment which has been demonstrated to inactivate the FMD virus.</td>
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<tr>
<td></td>
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<td>Thorough cooking:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meat, previously deboned and defatted, shall be subjected to heating so that an internal temperature of 70°C or greater is maintained for a minimum of 30 minutes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>After cooking, it shall be packed and handled in such a way that it cannot be exposed to a source of virus.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Drying after salting:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>When rigor mortis is complete, the meat must be deboned, salted with cooking salt (NaCl) and completely dried. It must not deteriorate at ambient temperature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>‘Drying’ is defined in terms of the ratio between water and protein which must not be greater than</td>
</tr>
<tr>
<td>Name of disease and species affected</td>
<td>Present in unprocessed meat products</td>
<td>Present in Hides &amp; Skins</td>
<td>Treatments to inactivate disease</td>
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</tr>
<tr>
<td>Vesicular stomatitis</td>
<td>no</td>
<td>no</td>
<td>Animal Products: This disease is not spread via meat or hides and skins. It is a disease spread by direct contact of affected animals and by insects.</td>
</tr>
<tr>
<td>Buffalo, Cattle, Deer, Goats, Horses, Pigs, Sheep</td>
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<tr>
<td>Rinderpest</td>
<td>yes</td>
<td>yes</td>
<td>Animal Products: Rinderpest would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products from affected animals would be traced and disposed of.</td>
</tr>
<tr>
<td>Buffalo, Cattle, Deer, Goats, Horses, Pigs, Sheep</td>
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</tr>
<tr>
<td>Peste des petits ruminants</td>
<td>yes</td>
<td>yes</td>
<td>Animal Products: Peste des petits ruminants would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products would be traced and disposed of.</td>
</tr>
<tr>
<td>Deer, Goats, Sheep</td>
<td></td>
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</tr>
<tr>
<td>Contagious bovine pleuroneumonia</td>
<td>no</td>
<td>no</td>
<td>Contagious bovine pleuroneumonia would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products would be disposed of.</td>
</tr>
<tr>
<td>Buffalo, Cattle</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Lumpy skin disease</td>
<td>no</td>
<td>yes</td>
<td>Hides &amp; Skins: Must be fully processed. High alkaline pH will kill virus in hides.</td>
</tr>
<tr>
<td>Buffalo, Cattle</td>
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<tr>
<td>Name of disease and species affected</td>
<td>Present in unprocessed meat products</td>
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</tr>
<tr>
<td>Rift Valley fever</td>
<td>yes</td>
<td>yes</td>
<td>Rift Valley fever would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products would be disposed of.</td>
</tr>
<tr>
<td>Buffalo, Cattle, Deer, Goats, Sheep</td>
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</tr>
<tr>
<td>Bluetongue</td>
<td>no</td>
<td>yes</td>
<td><strong>Hides &amp; Skins:</strong> Must be fully processed. High alkaline pH will kill virus in hides. Premises that receive affected live animals may need to implement an insect control program – to control vectors.</td>
</tr>
<tr>
<td>Buffalo, Cattle, Deer, Goats, Sheep</td>
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<tr>
<td>Sheep pox and goat pox</td>
<td>no</td>
<td>yes</td>
<td>Sheep pox and goat pox would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products would be disposed of.</td>
</tr>
<tr>
<td>Sheep, Goats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthrax</td>
<td>yes</td>
<td>yes</td>
<td>Anthrax would be eradicated quickly from NZ by use of stamping out. Animals would be killed and incinerated. Animal products would be disposed of.</td>
</tr>
<tr>
<td>All Animals</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Aujeszky’s disease</td>
<td>yes</td>
<td>yes</td>
<td><strong>Animal Products:</strong> Seropositive animals may be salvaged. Normal meat pH changes and the storage of the product at –20°C will inactivate the virus. Clinically infected animals detected at antemortem or postmortem inspection must be condemned and subjected to rendering. <strong>Hides &amp; Skins:</strong> Must be fully processed, the high alkaline pH change will inactivate the virus.</td>
</tr>
<tr>
<td>Cattle, Goats, Pigs, Sheep</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Echinococcosis / hydatidosis</td>
<td><strong>Yes</strong></td>
<td>no</td>
<td><strong>Animal Products:</strong> The animal carcass affected with echinococcosis is approved if edema and emaciation are not found. Otherwise the carcass is condemned. The affected organs are also condemned and must be destroyed. The lungs are most commonly affected and these should be carefully checked because lesions are often missed on routine inspection.</td>
</tr>
<tr>
<td>All Animals</td>
<td></td>
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</tr>
<tr>
<td>Name of disease and species affected</td>
<td>Present in unprocessed meat products</td>
<td>Present in Hides &amp; Skins</td>
<td>Treatments to inactivate disease</td>
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<tr>
<td>Leptospirosis (exotic strains)</td>
<td>Yes</td>
<td>Yes</td>
<td><strong>Animal Products</strong>: Carcass of an animal affected with acute leptospirosis is condemned. A chronic and localized condition may warrant an approval of the carcass. <strong>Hides &amp; Skins</strong>: Dried &amp; Salted</td>
</tr>
<tr>
<td>Rabies</td>
<td>no</td>
<td>no</td>
<td>Rabies would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products would be disposed of.</td>
</tr>
<tr>
<td>Acute haemorrhagic septicaemia</td>
<td>yes</td>
<td>no</td>
<td><strong>Animal Products</strong>: Carcass of an animal affected with haemorrhagic septicemia is condemned.</td>
</tr>
<tr>
<td>Theileriosis (exotic strains)</td>
<td>Yes</td>
<td>no</td>
<td><strong>Animal Products</strong>: Carcass and viscera of an animal affected with febrile chronic theileriosis and without systemic lesions are approved. Carcass is condemned, if acute febrile theileriosis is accompanied with fever and generalized lesions. The affected organs are also condemned.</td>
</tr>
<tr>
<td>Bovine Spongiform Encephalopathy</td>
<td>Yes</td>
<td>No</td>
<td><strong>Animal Products</strong>: Animals found to be affected with a spongiform encephalopathy are excluded from production of food for both human and non-human consumption. Animals would be killed and incinerated.</td>
</tr>
<tr>
<td>Name of disease and species affected</td>
<td>Present in unprocessed meat products</td>
<td>Present in Hides &amp; Skins</td>
<td>Treatments to inactivate disease</td>
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<tr>
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</tr>
<tr>
<td>Contagious caprine pleuropneumonia Goats</td>
<td>yes</td>
<td>no</td>
<td><strong>Animal Products:</strong> Affected organs to be condemned. Animals showing septicaemia form of disease are to be condemned. <a href="http://www.fao.org">http://www.fao.org</a></td>
</tr>
<tr>
<td>Scrapie Goats, Sheep</td>
<td>yes</td>
<td>no</td>
<td><strong>Animal Products:</strong> Animals found to be affected with a spongiform encephalopathy are excluded from production of food or other animal products.</td>
</tr>
<tr>
<td>Maedi-visna Goats, Sheep</td>
<td>no</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>
| Brucellosis All Animals | Yes | Yes | **Animal Products:** carcasses affected with brucellosis are approved (after removal of affected parts), as Brucella bacteria remain viable for only a short period in the muscles after slaughter. In acute abortive form (after the miscarriage), cattle carcasses are condemned. Pig, sheep, goat and buffalo carcasses require total condemnation. Heat treatment may be recommended in some areas for these species due to economic reasons. Affected part of the carcass, udder, genital organs and corresponding lymph nodes must be condemned.  
**Hides and Skins:** This organism can survive on raw untreated animal skins, but is killed by the salting and liming processes of modern tanning. |
| Trichinellosis | yes | no | **Animal Products:** carcasses affected with trichinellosis should be condemned. |
| Japanese encephalitis (West Nile Fever) Hares, Horses, Rabbits, birds, reptiles | Yes | No | **Animal Products:** carcasses from animals affected with West Nile Fever should be condemned. |

African Swine Fever would be eradicated quickly from NZ by use...
<table>
<thead>
<tr>
<th>Name of disease and species affected</th>
<th>Present in unprocessed meat products</th>
<th>Present in Hides &amp; Skins</th>
<th>Treatments to inactivate disease</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>African Swine Fever</strong>&lt;br&gt;Pigs</td>
<td>yes</td>
<td>yes</td>
<td>of stamping out. Animals would be killed and either buried or incinerated. Animal products from affected animals would be traced and disposed of.</td>
</tr>
<tr>
<td><strong>Classical swine fever</strong>&lt;br&gt;Pigs</td>
<td>Yes</td>
<td>Yes</td>
<td>Classical Swine Fever would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products from affected animals would be traced and disposed of.</td>
</tr>
<tr>
<td><strong>Nipah virus encephalitis</strong>&lt;br&gt;Pigs</td>
<td></td>
<td></td>
<td>Nipah virus would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products from affected animals would be traced and disposed of.</td>
</tr>
<tr>
<td><strong>Swine vesicular disease</strong>&lt;br&gt;Pigs</td>
<td>Yes</td>
<td>Yes</td>
<td>Swine vesicular disease virus would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products from affected animals would be traced and disposed of.</td>
</tr>
<tr>
<td><strong>Chronic wasting disease</strong>&lt;br&gt;Deer</td>
<td>Yes</td>
<td>No</td>
<td><strong>Animal Products:</strong> Animals found to be affected with a spongiform encephalopathy are excluded from production of food or other animal products.</td>
</tr>
<tr>
<td><strong>Equine encephalomyelitis</strong>&lt;br&gt;(Eastern, Western and Venezuelan) &lt;br&gt;Horses</td>
<td>Yes</td>
<td>No</td>
<td><strong>Animal Products:</strong> Clinical animals must be condemned.</td>
</tr>
</tbody>
</table>
| **Surra (Trypanosoma evansi)**<br>Buffalo, Cattle, Deer, Horses | Yes                                 | No                      | **Animal Products:** Carcass of an animal showing chronic lesions of trypanosomiasis without systemic involvement and the carcass of recovered animals is approved. Horse carcass affected with the disease is condemned if clinical
<table>
<thead>
<tr>
<th>Name of disease and species affected</th>
<th>Present in unprocessed meat products</th>
<th>Present in Hides &amp; Skins</th>
<th>Treatments to inactivate disease</th>
</tr>
</thead>
</table>
| Tularemia Horses, Hares, Rabbits   | Yes                                  | Yes                     | signs are accompanied with emaciation and edema or anaemia.  
**Note:** Hides and skins to be treated to eliminate the presence of ticks. |
| Leishmaniosis Horses               | No                                   | No                      | **Note:** Tularemia would be eradicated quickly from NZ by use of stamping out. Animals would be killed and either buried or incinerated. Animal products would be disposed of.  
**Note:** Tularemia can be spread by ingestion and aerosols and poses a serious zoonotic risk.  
**Note:** Hides and skins to be treated to eliminate the presence of ticks. |
9  Appendix 3 – Decontamination Operational Guideline

9.1  Introduction

Decontamination is the combination of physical and chemical processes that kills or removes organisms and is vital for effective eradication. Thorough decontamination will reduce the risk of risk organism spread.

This section provides guidance for the decontamination of premises where infected material is or has been suspected to have been present. Most of the risk organisms covered are viruses. This is reflected in the recommendations provided.

Identification of the risk organism is fundamental for designing an appropriate decontamination strategy. An understanding of biological properties forms the basis for the specific strategy. Importance is placed on the adoption of basic microbiological principles - isolating the source of infection and decontamination of personnel, equipment, vehicles and sites. Personal decontamination procedures, when properly carried out, will ensure safe movement.

Preliminary cleaning is needed before any chemical disinfectants are used and this aspect cannot be over-emphasised. Mechanical brushing of surfaces with a detergent solution is highly effective in removing contaminated material and is fundamental for achieving subsequent effective chemical disinfection. Procedures described may appear simple and tedious, however, persistence and attention to detail is vital.

A relatively narrow range of disinfectants and other chemicals are recommended fitting into six general groups:

1. soaps and detergents
2. oxidising agents
3. alkalis
4. acids
5. aldehydes
6. insecticides
All the above disinfectants are effective against a broad range of viruses. The disinfectants recommended are also generally those available in large quantities.

Note: Common chemical names are used because they are more easily understood by most personnel. Clear instructions are given for dilution and application of these disinfectants (see Table 3).

9.2 How to use this section

This section has a series of simple tables that clearly set out information on cleaning, disinfection and safety precautions.

- to check the best type of disinfectant for viruses see Tables 1 and 4
- to check the best type of disinfectant to use on a variety of objects for each risk organism see Table 2
- to understand the organism you are facing see Table 1
- to understand specific decontamination principles see section 3.4
- to check the concentration and dilution of disinfectants see Table 3
- to check safety concerns see Table 4
- to read about decontamination principles see Sections 4 and 5

KNOW THE ENEMY

To eliminate the risk organism from clothing, vehicles, tools, or the environment, there must be a good understanding of the general properties of each infectious agent and the subtle ways each persists in the environment.

The set of tables in this section categorise specific risk organisms according to their physical characteristics to demonstrate which disinfectant is best used for inactivation.

9.2.1 Know the enemy

To eliminate the risk organism from clothing, vehicles, tools, or the environment, there must be a good understanding of the general properties of each infectious agent and the subtle ways each persists in the environment.
The set of tables in this section categorise specific risk organisms according to their physical characteristics to demonstrate which disinfectant is best used for inactivation.

### 9.2.2 Disinfectant susceptibilities of viruses

The viruses/disease agents can be categorised according to their size and whether or not they contain lipids. On this basis three categories of viruses can be identified as follows:

- **Category A** Lipid-containing viruses; intermediate to large size
- **Category B** No lipid in virus; small size
- **Category C** No lipid in virus; intermediate size

Table 1 shows virus families, species affected, main mode of transmission and category of the infective agents and a number of other diseases that are also considered important in the context of New Zealand dairy industry.

**Table 1 – Disinfectant susceptibility of specific risk organisms**

<table>
<thead>
<tr>
<th>Risk organism family</th>
<th>Diseases</th>
<th>Species affected</th>
<th>Transmission</th>
<th>Category of risk organism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bunyaviridae</strong></td>
<td>Rift Valley Fever</td>
<td>Ruminants</td>
<td>Insect vectors</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Nairobi sheep disease</td>
<td>Sheep, Goats</td>
<td>Insect vectors</td>
<td></td>
</tr>
<tr>
<td><strong>Flaviviridae</strong></td>
<td>Wesselsbron disease</td>
<td>Ruminants</td>
<td>Insect vectors</td>
<td>A</td>
</tr>
<tr>
<td><strong>Paramyxoviridae</strong></td>
<td>Rinderpest</td>
<td>Ruminants</td>
<td>Aerosols, ingestion</td>
<td>A</td>
</tr>
<tr>
<td><strong>Picornaviridae</strong></td>
<td>Foot &amp; Mouth disease²</td>
<td>Ruminants</td>
<td>Aerosols, ingestion</td>
<td>B</td>
</tr>
<tr>
<td><strong>Poxviridae</strong></td>
<td>Sheep/Goat pox</td>
<td>Sheep &amp; Goats</td>
<td>Contact, insect vectors</td>
<td>A</td>
</tr>
<tr>
<td><strong>Reoviridae</strong></td>
<td>Bluetongue</td>
<td>Ruminants</td>
<td>Insect vectors</td>
<td>C</td>
</tr>
<tr>
<td><strong>Retroviridae</strong></td>
<td>Maedi visna Pulmonary adenomatosis</td>
<td>Sheep, goats</td>
<td>Contact</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rhabdoviridae</strong></td>
<td>Vesicular stomatitis</td>
<td>Ruminants</td>
<td>Insect vectors</td>
<td>A</td>
</tr>
<tr>
<td><strong>Prions</strong></td>
<td>Scrapie</td>
<td>Sheep, Goats</td>
<td>Contact (prenatal/perinatal)</td>
<td>Special inactivation</td>
</tr>
<tr>
<td></td>
<td>BSE</td>
<td>Cattle</td>
<td>Ingestion</td>
<td>necessary²</td>
</tr>
</tbody>
</table>
### Bacillaceae
- **Anthrax**  
  - Sheep, Goats, Cattle  
  - Ingestion, contact

### Togaviridae
- **Classical swine fever**  
  - Ruminants  
  - Contact, ingestion

#### KEY

1. **Category A** – best disinfectants are detergents, hypochlorites, alkalis, Virkon®, glutaraldehyde  
   Category B – best disinfectants are hypochlorites, alkalis, Virkon®, gluteraldehyde;  
   - Acids effective for FMD virus  
   - classical bactericides like QAC’s & phenolics are NOT effective against these viruses  
   Category C – these viruses fall between Cat A & B in sensitivity to the best disinfectants such as hypochlorites, alkalis, Virkon®, glutaradehyde

2. Acidic disinfectants have traditionally been used for these pathogens

3. Oxidising agents such as hypochlorites and peroxides are most effective in deactivation of these organisms

*Note: details of effective concentrations and applications of specific disinfectants are found in Table 3*

#### 9.2.3 Table 2 - Disinfectant/chemical selections for particular disease agents

The following table shows how to select a disinfectant/chemical to decontaminate common items. Where a common decontamination strategy is recommended, risk organisms have been grouped. The lists aim to give the operator more than 1 choice of disinfectant.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Category C Bluetongue</td>
<td>Decrease insect vector habitats</td>
<td>1</td>
<td>N/A</td>
<td>Decrease insect vector habitats</td>
<td>Decrease insect vector habitats</td>
<td>Bury or 6a or 6b to prevent insect breeding</td>
<td>6a or 6b for vehicle disinfection if necessary</td>
<td>1</td>
</tr>
<tr>
<td>Non-viral – prions BSE &amp; Scrapie</td>
<td>1 then 2a</td>
<td>See BSE or Scrapie disease strategies</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Bury or burn</td>
<td>2a</td>
<td>Burn if heavily contaminated</td>
</tr>
<tr>
<td>Category B FMD</td>
<td>3</td>
<td>1, 4b</td>
<td>5c</td>
<td>3</td>
<td>3</td>
<td>Bury or 4</td>
<td>2c, 3, 4</td>
<td>2, 2c, 3, 4b</td>
</tr>
<tr>
<td>Category A Lumpy Skin Disease Sheep &amp; Goat Pox</td>
<td>2 or 3 or 4b</td>
<td>1, 2, 3b, or 4b</td>
<td>5c</td>
<td>Decrease insect vector habitats</td>
<td>Decrease insect vector habitats</td>
<td>Bury and 6a or 6b for insect control</td>
<td>1 followed by 2, 3 or 4b</td>
<td>Destroy if not valuable, or 2, 3 or 4b</td>
</tr>
<tr>
<td>Category A Peste des petits ruminants Rinderpest</td>
<td>2 or 3</td>
<td>1, 2c or 4b</td>
<td>5c</td>
<td>Drain to pasture where possible</td>
<td>Drain to pasture where possible</td>
<td>2, 3, 4 then bury</td>
<td>1 (to clean) followed by 2a, 2b, 2c or 3 if necessary</td>
<td>1 (to clean) followed by 2a, 2b, 2c or 3 if necessary</td>
</tr>
<tr>
<td>Category A Rift Valley Fever</td>
<td>2 or 4 and insect control 6a or 6b</td>
<td>2c or 4b</td>
<td>5 if necessary</td>
<td>Decrease insect vector habitats</td>
<td>Decrease insect vector habitats</td>
<td>Drain to pit/bury and 6a or 6b for insect control</td>
<td>1 (to clean) followed by 2 or 4</td>
<td>1 (to clean) followed by 2 or 4</td>
</tr>
<tr>
<td>Category A Vesicular stomatitis</td>
<td>6a</td>
<td>1</td>
<td>5c</td>
<td>Drain to pasture where possible; decrease insect vector habitat</td>
<td>Drain to pasture where possible; decrease insect vector habitat</td>
<td>Bury or 6a</td>
<td>6b (to kill insects) 1 (to remove virus)</td>
<td>6b (to kill insects) 1 (to remove virus)</td>
</tr>
</tbody>
</table>

Table 2 - Key:

1. Soaps & Detergents
2. Oxidising agents;
   a. Sodium hypochlorite
   b. Calcium hypochlorite
c. **Virkon®**

3. **Alkalis;**
   a. Sodium hydroxide (caustic soda, NaOH). Note: do not use with aluminium and like alloys
   b. Sodium carbonate (anhydrous Na2CO3 or washing soda Na2CO3.10H2O)

4. **Acids;**
   a. Hydrochloric acid (HCl)
   b. Citric acid

5. **Aldehydes;**
   a. Gluteraldehyde
      
      Note: Gluteraldehyde is not too corrosive on metals but must not be used on humans or animals
   
   b. Formalin;
   c. Formaldehyde gas
      
      Note: Gaseous formaldehyde is dangerous and subject to error; it should only be used by experienced personnel and in controlled conditions

6. **Insecticides;**
   a. Organophosphates
   b. Synthetic pyrethroids
   c. Vermectin
   d. Phostoxin

### 9.3 Weapons-disinfectants/chemicals for inactivation of risk organism

#### 9.3.1 Introduction

This section provides direct advice for the decontamination of premises, vehicles and personnel.
9.3.2 Decontamination

Decontamination is the combination of physical and chemical processes which kills or removes pathogenic organisms, but does not necessarily result in sterility. A disinfectant is a chemical or mixture of chemicals capable of killing pathogenic micro-organisms.

9.3.3 Basic assessments

The most important initial information is the identification of the risk organism involved. Once established, its basic properties must be considered:

- What are the characteristics of the spread of the risk organism?
- Has transmission occurred by aerosol spread, oral ingestion, close contact or insect vectors?

From this information, a plan can be devised to establish priorities for decontamination. Such a plan usually includes buildings with wooden, metallic or masonry structures, machinery of mostly metallic components, pipe work of various types, water tanks, product storage areas and effluent waste streams. Depending on the risk organism involved, different decontamination procedures and disinfectants are likely to be used for different sites on the property.

In some cases where the risk organism does not spread directly from animal to animal (e.g. Bluetongue) comprehensive decontamination of property is not warranted. In contrast, some viruses such as FMD, are relatively stable on inanimate objects and can be spread to animals from contaminated people, clothing and equipment. Viruses that can be spread by such contact will require the most comprehensive decontamination programmes.

Preliminary cleaning should be undertaken before any chemical disinfectants are used. The natural processes of time, dehydration, warm temperature and sunlight will greatly assist the decontamination operation and should be considered in planning. A hot, dry, sunny day will cause rapid natural inactivation of some risk organisms whereas cold, damp, overcast conditions may assist persistence.

Simple cleaning of surfaces by scrubbing with a detergent solution is effective in removing risk organisms and is fundamental for achieving effective chemical decontamination. Most disinfectants have reduced effectiveness in the presence of organic matter. Every effort should be made to remove organic matter from all surfaces to be decontaminated.

Choice of disinfectant depends on the method of application and how an adequate contact time is to be maintained.
Choosing the most appropriate disinfectant is dependent on the nature of the risk organism. Useful clues for predicting susceptibility of viruses are the presence or absence of lipid in the virus particles and the virus size. In this predictive system, viruses fall into three groups:

**Category A** viruses are medium to large in size and contain lipid which makes them very susceptible to detergents, soaps and all of the disinfectants listed in Section 3.4, below. Such viruses are susceptible to dehydration and often do not persist long unless in cool, moist environments.

**Category B** viruses have no lipid, are smaller and more hydrophilic. Such viruses are relatively resistant to lipophilic disinfectants such as detergents. Although they are sensitive to all the other disinfectants listed in Section 3.2, they are less susceptible than viruses in Category A. Classical bactericides such as QAC’s and phenolics are not effective against these viruses.

**Category C** viruses are medium sized and lack lipid. These viruses fall between Categories A and B in sensitivity to the best anti-viral disinfectants such as hypochlorites, alkalis, oxidising agents, e.g. Virkon® and aldehydes.

### 9.3.4 Precautions when using disinfectants

Chemicals usually kill micro-organisms by toxic reactions, and effective disinfectants are often toxic for animal (and human) tissues as well. Most disinfectants have to be used with care to avoid occupational injuries or health problems. Table 4 provides some basic information about precautions and contraindications when using the recommended disinfectants.

### 9.4 Selection of disinfectants

This section concentrates on a narrow range of disinfectants that are effective against a broad group of organisms. Consequently, disinfectants recommended are those that are readily available in large quantities.

These disinfectants are grouped into 5 categories:

i. Soaps & detergents
ii. Oxidising agents
iii. Alkalis
iv. Acids
v. Aldehydes
Note: Commonly used general disinfectants such as phenolics and quaternary ammonium compounds are very effective antimicrobials but have limited effectiveness against Category B&C virus and have therefore been excluded.

9.4.1 Soaps & Detergents

Soaps and detergents are essential components of the cleaning process prior to decontamination. The primary aim is the removal of organic matter from surfaces to be decontaminated. Most industrial and domestic brands of soaps and detergents are satisfactory. Hot water, brushing and scrubbing enhance the cleaning action. Similarly, steam improves the cleaning and decontamination process by raising the temperature and penetrating crevices.

In addition, the surfactant action of soaps and detergents is an effective decontaminant for all Category A viruses because of their outer lipid envelope. Therefore for decontamination procedures involving viruses in Category A, soaps and detergents are effective disinfectants in their own right.

9.4.2 Oxidising agents

These are the disinfectants recommended for most applications. Chlorine is released from hypochlorite solutions (either sodium or calcium) and is a powerful oxidising agent effective in killing all virus groups.

A 0.175% sodium hypochlorite solution is the most effective and practical broad spectrum disinfectant against a range of different organisms. However, the effectiveness of hypochlorite is highest in the pH range 6-9 and decreases steadily in the presence of organic material. Hypochlorite powders are readily available and are commonly used around sites on concrete surfaces and walkways in open areas as part of the site pathogen management strategy.

Virkon® is a modern disinfectant with very effective virucidal properties. Virkon® is reported to have low toxicity and to be effective against members of all 17 virus families but it has not been approved for use on skin. It is relatively safe to use and comes in a powdered form ideal for dilution. It can be distributed in powdered form over wet or dry surfaces, but the concentration of disinfectant achieved by that kind of application cannot be accurately controlled.

9.4.3 Alkalis

Alkalis have long been used as effective disinfectants against a wide range of pathogens. Both sodium hydroxide (caustic soda) and sodium carbonate (washing soda) are widely available in large quantities at low cost and both have a natural saponifying action on fats and other types of organic matter which
assists the cleaning process. Because they are virucidal under heavy loads of organic material, they are ideal agents for decontaminating yards, drains and effluent waste pits.

9.4.4 Acids

Acids are generally highly virucidal and with the correct choice of acid or acid mixture, can be used under a wide variety of conditions ranging from liquid effluent to personal decontamination. Hydrochloric acid is a strong acid, widely available and less toxic than other strong acids. Citric acid is a milder acid available in solid form that is active against acid sensitive viruses and can be used safely for personnel and clothing decontamination. It is particularly useful when added to detergents for the inactivation of FMD virus.

9.4.5 Aldehydes

Glutaraldehyde
A very effective disinfectant against all virus families (and other micro-organisms) in concentrations of 1 to 2%. It remains effective in moderate concentrations of organic material, is chemically stable and only mildly corrosive for metals. Not considered suitable for large scale decontamination due to the high cost.

Formalin
A 40% aqueous solution of formaldehyde gas and is a useful disinfectant. Formalin diluted with 12 volumes of water produces 8% formalin that is an active disinfectant against most virus families.

Gaseous formaldehyde
Gaseous formaldehyde can be used to decontaminate air spaces, equipment that must be kept dry (such as electronic devices), and the insides of motor vehicle cabins and shipping containers. However, the conditions must be carefully controlled in terms of gas concentration, temperature, humidity, time of contact and even gas distribution. The space to be decontaminated must be completely sealed to prevent gas escape as the most effective ‘dwell’ time for the inactivation is an overnight period. Other problems with the use of formaldehyde gas for general purposes include toxicity; the dangerous nature of its generation, the environmental protection guidelines that prevent release of formaldehyde gas to the atmosphere; and the difficulty of completely purging residual formaldehyde gas from confined spaces.

In general, unless no alternatives are available, the use of formaldehyde gas is not recommended.
Unfortunately, no satisfactory alternative to formaldehyde for gaseous decontamination is available. Use of ethylene oxide or hydrogen peroxide for gaseous decontaminations must be restricted to carefully controlled environments.

For decontamination of vehicle cabins and electronic equipment, a clear-cut answer is not possible. Cleaned vehicles and other machinery left in quarantine for a week in bright sunshine are likely to decontaminate naturally with respect to most pathogens. Because the parameters for effective formaldehyde decontamination are so difficult to establish on a premises, formaldehyde gas is unlikely to produce an absolute result or to be significantly more effective than thorough cleaning. Where gaseous decontamination of equipment or machinery is considered to be unavoidable, specialist advice should be sought, and the contaminated equipment kept in quarantine until that time.

Table 3 shows which disinfectant should be used for inactivating each category of virus and what dilutions/concentration should be used.
Table 3 – Recommended disinfectants and concentration for inactivation of viruses

<table>
<thead>
<tr>
<th>Disinfectant group</th>
<th>Form¹</th>
<th>Strength² Usual dilution</th>
<th>Final³</th>
<th>Contact time⁴</th>
<th>Applications &amp; virus category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soaps &amp; Detergents</td>
<td>Solids or liquids</td>
<td>As appropriate</td>
<td></td>
<td>10 mins</td>
<td>Thorough cleaning is an integral part of effective decontamination. Use for Category A viruses</td>
</tr>
<tr>
<td>Oxidising Agents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium hypochlorite NaOCl</td>
<td>Conc. Liquid (10-12% available chlorine)</td>
<td>1:5</td>
<td>2-3% available chlorine</td>
<td>10-30 mins</td>
<td>Use for virus categories A, B &amp; C. Effective for most applications, except in the presence of organic material</td>
</tr>
<tr>
<td>Calcium hypochlorite Ca(OCl)₂</td>
<td>Solid</td>
<td>30g/litre</td>
<td>2-3% available chlorine</td>
<td>10-30 mins</td>
<td>Less stable in warm, sunny conditions above 15°C.</td>
</tr>
<tr>
<td>Virkon®</td>
<td>Powder</td>
<td>20g/litre</td>
<td>2%w/w</td>
<td>10 mins</td>
<td>Excellent disinfectant active against all virus families</td>
</tr>
<tr>
<td>Alkalis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide NaOH</td>
<td>Pellets or conc.</td>
<td>20g/litre</td>
<td>2%w/v</td>
<td>10mins</td>
<td>Very effective against virus categories A, B &amp; C. Do not use in the presence of aluminium or derived alloys</td>
</tr>
<tr>
<td>Sodium carbonate -anhydrous Na₂CO₃</td>
<td>Powder</td>
<td>40g/litre</td>
<td>4%w/v</td>
<td>10mins</td>
<td>Recommended for use in the presence of high concentrations of organic material</td>
</tr>
<tr>
<td>-washing soda Na₂CO₃.10H₂O</td>
<td>Crystals</td>
<td>10%w/v</td>
<td>10%w/v</td>
<td>30mins</td>
<td></td>
</tr>
</tbody>
</table>
### Acids

<table>
<thead>
<tr>
<th>Product</th>
<th>Form</th>
<th>Strength</th>
<th>Concentration</th>
<th>Duration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochloric acid HCl</td>
<td>Conc. Liquid</td>
<td>1:50</td>
<td>2%w/v</td>
<td>10mins</td>
<td>Used only when better disinfectants are not available. Corrosive for may metals &amp; concrete</td>
</tr>
<tr>
<td>Citric acid</td>
<td>Powder</td>
<td>2g/litre</td>
<td>0.2%w/v</td>
<td>30 mins</td>
<td>Safe for clothing and personal decontamination. Especially useful for FMD virus decontamination</td>
</tr>
</tbody>
</table>

### Aldehydes:

<table>
<thead>
<tr>
<th>Product</th>
<th>Form</th>
<th>Strength</th>
<th>Concentration</th>
<th>Duration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gluteraldehyde</td>
<td>Conc. Solution</td>
<td>As appropriate</td>
<td>2%w/v</td>
<td>10-30mins</td>
<td>Excellent disinfectant effective against virus categories A, B &amp; C</td>
</tr>
<tr>
<td>Formalin</td>
<td>40% formaldehyde</td>
<td>1:12</td>
<td>8%w/v</td>
<td>10-30mins</td>
<td>Disinfectant releases irritating, toxic gas</td>
</tr>
<tr>
<td>Formaldehyde gas</td>
<td>Special generation required</td>
<td></td>
<td></td>
<td>15-24hrs</td>
<td>Toxic gas, recommended only if other methods of decontamination cannot be used</td>
</tr>
</tbody>
</table>

**Notes:**

Products effective for decontamination of viruses on the hands and skin are limited. Virkon® is reported to have low toxicity and to be effective against all 17 virus families but has not been approved/recommended for use on skin. Alternatively, citric acid or sodium carbonate may be added to washing water to lower the pH as appropriate for the agent to be inactivated.

**Key:**

1. usual form supplied  
2. recommended working strength  
3. final concentration
4. required time for inactivation of disease agents

5. The contact time at this concentration is applicable for surface with a presence of organic matter. The measurement of pH of the solution is important to lessen the contact time to 15 seconds. A pH of 2.5 – 3.7 should be maintained and a surfactant should also be added to the solution.

Table 4: Special considerations when using disinfectants:

Note: For occupational safety and health and environmental considerations, operators should make themselves aware of the specific hazards and instructions for handling and use of the disinfectant they are using. All containers used should be clearly identified.

<table>
<thead>
<tr>
<th>DISINFECTANT</th>
<th>HEALTH ASPECTS</th>
<th>ENVIRONMENTAL PROBLEMS &amp; CONTRAINDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypochlorites</td>
<td>Toxic for eyes &amp; skin</td>
<td>Strong bleach. Inhibited by high concentrations of organic material. Corrosive for many metals. Use in the presence of ammonia (including urine) produces chlorine gas and should be avoided.</td>
</tr>
<tr>
<td>Virkon</td>
<td>Reasonable care necessary</td>
<td></td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>Caustic for eyes &amp; skin</td>
<td>Avoid contact with strong acids. Cannot be used on aluminium or like alloys.</td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>Mildly caustic for eyes &amp; skin</td>
<td>Avoid use with aluminium and like alloys</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>Toxic for eyes, skin &amp; respiratory passages</td>
<td>Corrosive for many metals and concrete. Avoid contact with strong alkalis.</td>
</tr>
<tr>
<td>Gluteraldehyde</td>
<td>Avoid eye &amp; skin contact</td>
<td></td>
</tr>
<tr>
<td>Formalin solution</td>
<td>Releases toxic gas; irritant for mucous membranes</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde gas</td>
<td>Very toxic for mucous membranes in concentrations as low as 2ppm</td>
<td>Cannot be used in the presence of water, hypochlorites or chlorides. Cannot be released into the atmosphere without neutralization. Corrosive to some metals.</td>
</tr>
</tbody>
</table>