



# Dairy Industry Guidelines for Risk Organism Preparedness and Response

October 2008

Version 1

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## **Authorisation**

This guideline has been revised by the New Zealand Food Safety Authority, in association with dairy industry representation and is authorised by MAFBNZ as the requirements to control the potential spread of risk organisms in the dairy industry.

The guideline specifies the dairy industry requirements outlined in the MAF Standard 153 series (Standard 153.06 - Chapter 2) and encourages all processors of dairy material and dairy products to prepare response procedures in advance, to ensure the potential spread of disease is effectively controlled with minimum disruption during milk collection, processing, and distribution.

This guideline also contains a list of the risk organisms of sheep, goats and cattle that may also be involved in a response.

The requirements specified in this guideline are to be implemented immediately when a response is notified by the Chief Technical Officer MAFBNZ.

**Carol Barnao**

**Director - Standards**

New Zealand Food Safety Authority

## Amendments

Suggestions for alterations and improvements should be sent to the Guideline Co-ordinator together with relevant information.

After investigation and consultation with MAFBNZ and the dairy industry Representative, the Co-ordinator will prepare amendments for review prior to distribution to current guideline holders.

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Authorised by: Carol Barnao

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# 1 Purpose and Scope of the Guideline

## 1.1 Purpose

The purpose of this guideline is to:

- Specify the requirements for the control of risk organisms of significance to the New Zealand Dairy Industry.
- Provide guidance material to assist processors of dairy material and products for preparing Risk Organism Response Plans.

Rapid and successful implementation of these contingencies will assist with eradication of the specific risk organism and an earlier resumption of international trade.

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

## 1.2 Scope

This guideline applies to all processors of dairy material and dairy product in New Zealand.

This guideline includes:

- Dairy industry responsibilities
- Development and maintenance of Dairy Risk Organism Response Plans
- The role of the New Zealand Food Safety Authority
- The role of the MAF Biosecurity New Zealand
- The role of the Recognised Agency.

## 1.3 References

- MAF Standard 153.06 Production and Processing Industries. (Chapter 3)
- Biosecurity Act 1993

- The Animal Products Act 1999
- Animal Products (Dairy Risk Management Programme Specifications) Notice 2005
- Animal Products (Dairy Processing Specifications) Notice 2006
- Animal Products (Dairy Recognised Agency and Recognised Persons Specifications) Notice 2005
- DPC3: Animal Products (Dairy) Approved Criteria for the manufacturing of Dairy Material and Products
- Australian Veterinary Emergency Plan AUSTVETPLAN 2000, Operational Procedures Guideline – Decontamination
- OIE Terrestrial Animal Health Code 2004.

## 1.4 Acronyms

CA	Controlled Area
CIP	Cleaning-in-Place
CTO	Chief Technical Officer MAFBNZ
C&D	Cleaning and Disinfection
FMD	Foot and Mouth Disease
FORT	Field Operations Response Team
IDC	Investigation & Diagnostic Centre (Wallaceville)
ILO	Industry Liaison Officer of the Recognised Agency
IIV	Initial Investigating Veterinarian
MAFBNZ	MAF Biosecurity New Zealand
MCGM	Movement Control Group Manager
NRC	National Response Centre
NZFSA	New Zealand Food Safety Authority

OIE	Office International des Epizooties World (Organisation for Animal Health)
RA	Recognised Agency
RM	Response Manager
RP	Restricted Place
RPM	Restricted Place Manager
SRO	Site Response Officer of the Recognised Agency

## 1.5 Definitions

**Animal Products** - Products (meat and dairy products, hides, skins, bee products, wool, poultry and egg products, fish and fish products and other edible and inedible materials) 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.

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

**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.

**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.

**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.

**Heat Treatment Equipment** - Includes plate heat exchangers, pasteurisers, evaporators, vacreators, hot wash systems, cookers and kettles.

**High Risk Areas** - Areas of the factory or site where raw milk, raw cream, untreated milk derivatives or effluent is handled or stored.

**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 dairy industry sites, Site Response Officers and obtaining MAFBNZ permits during a response.

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

**Infected Milk** - Milk that is known to have come from an animal that is infected or suspected to be infected with the 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** – A veterinarian who is authorised to carry out an investigation on a suspected case of a risk 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.

**Milk Product Derivatives** - Includes all by-products of whole milk, e.g. cream, skim-milk, whey, milk powder, casein, yoghurt, cheese and cream products.

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

**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 809 966 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	Telex: EPIZOOTI 642285F
75017 Paris	Telegraphic Address: INTEREPIZOOTIES
FRANCE	Telephone: (+33 1) 44 15 18 88
	Facsimile: (+ 33 1) 42 67 09 87
	E-mail: <a href="mailto:OIE@oie.int">OIE@oie.int</a>

**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, and in-process, e.g. lactic or mineral acid, casein, yoghurt and cheese manufacture.

**Procedure** – Technical descriptions of the processes to be undertaken by role holders to ensure policies 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 Manager (RM)** - The MAFBNZ Manager responsible to the Chief Technical Officer for the initial and transitional investigation of suspect cases and organism containment actions.

**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.

**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.

**Risk Organism Response Plan** - A documented plan prepared by animal products processing site personnel which specifies the actions to be taken on the site when a response is declared. 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.

**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 dairy material and dairy 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, dairy material and dairy product 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.

## 2 Risk Organisms

### 2.1 Risk Organisms that may affect the Dairy Industry

Risk organisms are pests and diseases that have not appeared in New Zealand previously or have been eradicated to enable New Zealand to be considered by OIE as free.

While foot and mouth disease (FMD) is one of the most feared risk organisms that could infect pastoral animals, there are a number of others that may involve the dairy processing industry in various stages of a response. However, as not all risk organisms that could infect milking animals (cows, sheep, goats or buffalo) are passed through the animal into their milk supply, the level of response may vary with each specific type.

OIE lists diseases of livestock that are caused by a range of “agents” from viruses (foot and mouth disease) to spore forming bacterium (anthrax).

Refer to Appendix 1 for a table of OIE list diseases likely to involve the dairy industry in a response. The list comments on the likely presence of each disease agent in the milk supply and the treatment required for inactivation.

For each disease listed, a profile has been developed which describes the characteristics of the organism, susceptibility to various conditions, recommended treatment, and the types of disinfectants that should be used to inactivate the disease agent.

### 2.2 The Economic Consequences

A biosecurity response to a risk organism would lead to embargoes on the importation of our 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 for certain animal products.

Product produced prior to the declaration of a response may be acceptable for export after the outbreak has been controlled. If the measures in this guideline are conscientiously followed, it is probable that NZFSA would be able to give certain specific safety assurances about product produced

both before and after the entry of the disease into New Zealand. Official assurances issued by NZFSA which currently contain attestations of New Zealand's disease freedom status may need to be amended, depending on the type of risk organism.

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

## **2.3 Specific Considerations for the Dairy Industry**

As milk tankers have been linked to the spread of risk organisms such as FMD in other countries, implementation of strict control practices during milk collection, processing and distribution will be necessary to prevent the spread of infection.

It is vital to have the ability to trace and identify sources and destination of potentially infectious movements (includes people, stock, and milk products) during the 14 days preceding first clinical signs or for as many days as MAFBNZ may stipulate. Dairy industry records will be required for trace back purposes. Provision of these records in a timely manner is critical to be able to contain the spread of the risk organism.

## **2.4 Diagnosis and Confirmation of Risk Organisms**

### **2.4.1 Investigation and Diagnosis**

Reporting a suspect case of a risk organism will initiate immediate dispatch of a trained Investigating Veterinarian to examine the suspect animals.

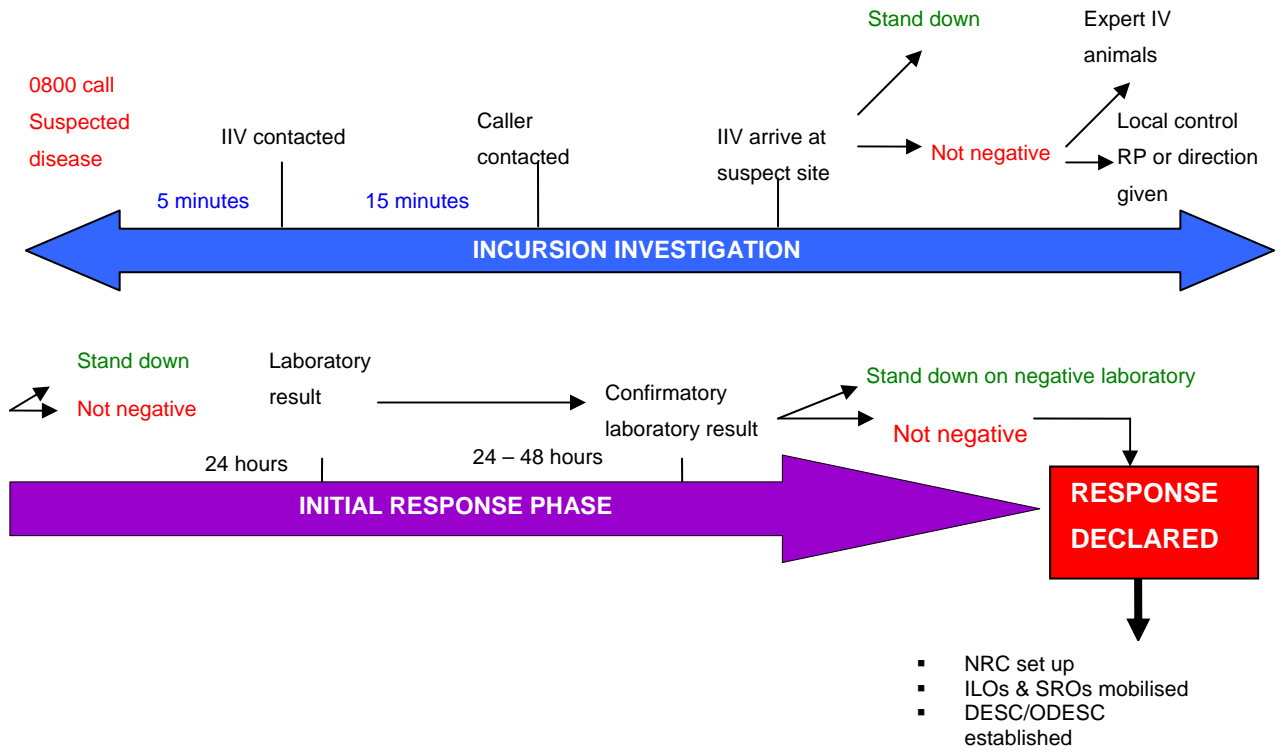
If a risk organism cannot be excluded, a second MAFBNZ Veterinarian (Incursion Investigator) with previous field experience will also examine the animals and provide a second opinion.

If the second Veterinarian cannot exclude the risk organism, MAFBNZ may initiate eradication or disease mitigation procedures as appropriate to the specific organism.

### **2.4.2 Confirmation**

Depending on the suspected disease type, samples could be sent to a World Reference Laboratory in the United Kingdom for confirmation of the specific risk organism. 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.

### 2.4.3 Diagrammatic Timeline of a Response



## 3 Dairy Industry Responsibilities

### 3.1 Dairy Company Responsibilities

#### 3.1.1 Dairy Company Responsibilities during a Response

In the event of a biosecurity response, a Recognised Agency Industry Liaison Officer will request dairy companies within Controlled Areas to immediately implement their Risk Organism Response Plan procedures covering the following operations as specified in the MAF Standard 153.06:

- Factory site and personnel control
- Milk collection and transfer of milk and milk product derivatives between factories
- Tanker cleaning and disinfection
- Milk reception, storage, treatment and processing
- Plant cleaning and disinfection
- Product and environmental sampling and testing
- Product identification, segregation, storage and distribution
- Effluent/waste disposal
- Farm services
- Milk and product traceback.

The dairy processing Site Co-ordinator or Designated Representative will need to liaise with the Site Response Officer to co-ordinate the implementation of the risk organism response plan and provide all information required to assist with the response.

Processing sites which are not able to meet MAFBNZ requirements may be required to cease milk collection and/or processing if continued operation is considered to jeopardise control of the risk organism.

Risk Organism Response Plans, including documented procedures and details of staffing, training and resources need to be verified by the Recognised Agency, as confirmation that the MAFBNZ requirements can be implemented effectively during a response. (Refer Sections 17 to 18.)

### **3.1.2 Dairy Industry Preparation for a Response**

Each company should allocate personnel for the following response planning responsibilities:

- Co-ordinate the development and maintenance of a site Risk Organism Response Plan and procedures to meet the technical requirements in Sections 5 to 16.
- Identify personnel and materials needed to implement procedures, e.g. assistance for tanker operators and milk reception personnel.
- Co-ordinate staff training and familiarisation with the site Risk Organism Response Plan and the SROs role and responsibilities.
- Co-ordinate provision and maintenance of all equipment, materials and chemicals to meet the technical requirements in this specification.
- Co-ordinate documentation and maintenance of records to assist the SRO with tracing and verification of product from milk collection, processing, storage and distribution.
- Liaise with the Recognised Agency to facilitate the verification of the Risk Organism Response Plan and procedures. Note: this can be timed to coincide with the Risk Management Programme (RMP) verification.
- Report to dairy company management on the state of site response preparedness.

## **3.2 New Zealand Dairy Exporter Responsibilities**

### **3.2.1 During an Risk Organism Response**

The Chief Technical Officer, or nominee at the National Response Centre, will advise dairy exporters with details of responses likely to affect international trading of New Zealand animal products. This may not be confined to risk organisms that directly affect dairy products.

Exporters will be asked to provide assistance or information on the following:

- Product in storage and transfer within New Zealand during the previous 14 days of a response or for as many days as Chief Technical Officer may stipulate, depending on the risk organism
- Products exported, shipping departures, port of loading, destination, and current position of shipping
- Providing alternative storage if necessary
- Product disposal if necessary.

The Chief Technical Officer or nominee will keep exporters advised of progress with information from International Governments and Border Entry Authorities during and after the response.

### **3.2.2 New Zealand Dairy Exporters Preparation for a Response**

Dairy Exporters will be asked to assist in preparation for a response by:

- Providing the Chief Technical Officer with the names of personnel to be contacted during a response.
- Liaison with MAFBNZ and the Recognised Agency on crisis management policies for Risk Organism Response Planning.
- Providing trace back information for all exports, departed & pending, as required.

## 4 NZFSA and MAFBNZ Responsibilities

### 4.1 Preparation

NZFSA and MAFBNZ provide guidance material for the establishment of processing site Risk Organism Response Plans in consultation with appropriate industry groups and negotiation of contracts with suppliers for preparedness monitoring, investigation and response services.

The Biosecurity Act provides the CTO with the necessary powers to direct response activities to contain or eradicate risk organisms by delegation to the Response Manager.

Investigation & Diagnostic Centre (IDC) of MAFBNZ Operations in Wallaceville is responsible for operating the risk organism surveillance programmes.

#### 4.1.1 National Response Centre (NRC)

During a response, the National Response Centre will be established in MAF Head Office, Wellington, as the National Headquarters for the Director General or CTO to direct response communications with the FORT for the Minister for Biosecurity, and NZFSA.

#### 4.1.2 NZFSA Response Centre

During a response, NZFSA will establish an operational co-ordination centre at the Head Office in Wellington. This is for the purposes of direct liaison with the ILO, importing country authorities, the NZFSA Export Certification office and NZ exporters and manufacturers.

### 4.2 Establishment of the MAFBNZ Response Centre

Where symptoms reported by veterinary practitioners or public information requires investigation, the Response Manager arranges for a trained veterinarian (IIV) to investigate the suspect case, reports to the CTO and arranges to establish the Response Centre if warranted.

If a suspect case is **Not Negative** the RM responds as follows:

- Arranges for a second veterinarian to advise on the case.



- Arranges for all SROs & ILOs, MAFBNZ and NZFSA staff with Biosecurity Response roles to be on standby.

If the second veterinarian advises the suspect case is still “Not Negative” the RM will:

- Establish and review the boundaries for a “Controlled Area”.
- Arrange for ‘Experts’ to assemble at the RC, including ILOs.
- Direct the implementation of response procedures and allocate SROs to move to processing sites.
- Request the procurement and mobilisation of all required resources.
- Order the slaughter of infected herds and disinfection of vehicles and premises.
- Restrict the movement of susceptible animals, products, equipment and people.
- Request the monitoring of susceptible animals.
- Request movements of at-risk animals, people, equipment and products are traced.

### **4.3 The Recognised Agency (RA)**

The Recognised Agency is contracted by NZFSA to verify Risk Organism Response Plans and by MAFBNZ to provide specialist resources for response activities at the RC and dairy processing sites.

#### **4.3.1 Assist Dairy Industry Response Preparation**

The Recognised Agency is contracted by NZFSA to assist the Dairy industry with preparedness for a biosecurity response, by:

- Assist NZFSA to maintain a current register of all processors of dairy material & dairy products including contact details and emergency liaison personnel at each premises
- Verification of each Risk Organism Response Plan & associated procedure
- Regular reporting to NZFSA on Industry preparedness status
- Participation in training activities to ensure currency of relevant competencies.

### **4.3.2 The Industry Liaison Officer (ILO) Role**

The Recognised Agency is contracted by NZFSA to provide ILOs that will be appointed to the Response Centre during a response to:

- Assign SROs to all dairy processing sites within the Controlled Area.
- Maintain communication with dairy processing sites, SROs and the Response Centre.
- Report to the Response Manager on progress with the implementation of response procedures at each site.

### **4.3.3 The Site Response Officer (SRO) Role**

SROs will be assigned to dairy processing sites to:

- Liaise with site management and act as the NZFSA and MAFBNZ contact on site.
- Monitor and verify the implementation of the Risk Organism Response Plan procedures.
- Exercise powers as Authorised Persons under the Biosecurity Act as deemed necessary.
- Ensure technical requirements are met.
- Report to the ILO on progress with implementation of Risk Organism Response Plans and procedures and identify any risks or issues.

## 5 Technical and Operational Requirements

### 5.1 Purpose

This section specifies the technical requirements that should be applied by processors of dairy material and dairy product within the Controlled Area during a biosecurity response.

A Risk Organism Response Plan should adequately address the company/site specific risks associated with each of the requirements listed in the scope of this section.

### 5.2 Scope

The technical requirements cover:

- Movement control
- Site and personnel control
- Milk collection and transport
- Milk reception and storage
- Milk treatment and process control
- Product identification, segregation, storage and distribution
- Cleaning and sanitising
- Laboratory control
- Effluent treatment and disposal
- Farm servicing
- Traceback.

## 6 Movement Control

### 6.1 Movement in and out of the Controlled Area

All movement of vehicles, animals and milk products within or out of the Controlled Area (CA) will require a MAFBNZ movement permit authorised and issued by MAFBNZ and distributed by ILO/SRO.

### 6.2 MAFBNZ Movement Permit

A MAFBNZ movement permit is required for:

- Tankers collecting milk from farms within the CA.
- Tankers intending to move out of, and then back into the CA.
- Vehicles, including tankers, transporting milk and milk product derivatives within the CA.
- Vehicles transporting milk and milk product derivatives through or out of the CA.
- Farm services vehicles on visits to properties within the CA.
- Vehicles removing treated dairy factory waste off dairy processing sites within the CA.

### 6.3 Issuance of Movement Permit

Permits to move will be issued by MAFBNZ and distributed by the SRO. Specific direction will be via the transport section of each company and consideration will be given to logistics and seasonal milk volumes to minimise disruption to collection and processing and adequately manage risk. Tankers entering the areas of greatest risk will receive priority attention on their return to site.

## 7 Site and Personnel Control

### 7.1 Vehicles

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

Vehicles collecting or transporting milk and milk product derivatives, shall be checked on entry and exit for the presence of a valid MAFBNZ movement permit.

Other vehicles moving on or off-site shall be checked for the absence of farm soil residues and cleared for entry and exit. Where there is any perceived risk, vehicles may be subject to C&D prior to exiting the site. Refer Appendix 4, Dairy Risk Profile.

Farmers or contractors shall not enter dairy processing sites to collect any waste products for use as stock food (e.g.: pig food) during a response.

### 7.2 Product and Samples

Only products that have been treated as per the context of this guideline and packaged securely, such as to prevent leakage & contamination, will be issued with a MAFBNZ movement permit to enable them to leave the factory site.

### 7.3 Milk Spills and Milk Product Wastes

Raw milk spills shall be sanitised as soon as they occur or immediately washed down the effluent drains (not storm water drains) for collection and treatment.

Milk, milk by-products (e.g. whey), product wastes (e.g. milk powder, casein sweepings) and loss-stream product shall not be fed to any animals unless authorised via the SRO. Note that OIE has disease specific requirements for treatment of product which is intended for animal consumption. These requirements should be considered the default reference standard.

Sludge from separators shall be piped directly to the effluent system, sanitised or incinerated.

All washings from High Risk areas shall be directed to the effluent system for treatment prior to disposal.

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

## 7.4 Personnel

***Note: It is essential that all personnel on site 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 shall enter and exit the site through controlled access and have their movement on/off site recorded.

Movement of personnel around the site shall be controlled by adherence to defined routes and use of allocated amenities.

Entry/egress for processing areas shall be controlled appropriately. Risk mitigation measures may include the use of footbaths and/or boot exchanges and personnel must adhere to the specific decontamination procedures for each processing department/area.

Personnel shall avoid contact with farm animals. Staff who own stock shall make alternative arrangements for feeding and stock work during a response to mitigate the risk of organism transmission/spread.

Personnel performing sanitising and cleaning duties in High Risk areas, e.g. milk collection, reception, milk treatment and effluent areas shall wear clothing and footwear that can be safely decontaminated or disposed of.

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

***Low Risk areas:*** Personnel working in these areas, e.g. processing, shall shower and change after the initial plant clean up and sanitising. Thereafter normal protective clothing and boot exchange procedures will apply.

**Personnel shall not, under any circumstances remove any Dairy Material or Product from site.** Inspection of personnel, property & conveyances (e.g. cars) may be undertaken prior to exit from the site by an Authorised Person.

## 7.5 Clothing and Footwear

All footwear and protective clothing worn in the High Risk areas shall be waterproof and be cleaned and sanitised after use.

Waterproof clothing and footwear shall be designated to specific areas on site and be used exclusively in those areas.

All protective clothing, outer clothing and footwear must be cleaned and sanitised at the end of each shift.

The system of laundering clothing shall be adequate to ensure inactivation of the contaminant and prevent cross-contamination between soiled and clean clothing.

## 7.6 Amenities

Meal facilities, toilets, showers and changing facilities shall be designated specifically for use by personnel working in High Risk areas, and shall be separate from amenities used by other personnel on site.

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

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

## 7.7 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 vacuum hose attachments which are moveable shall be designated to and be retained in specific areas or be cleaned and sanitised if movement is unavoidable.

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

## **7.8 Use of Contractors**

Where premises choose to use contracted services for tasks such as cleaning, laundry and rubbish disposal, it is the responsibility of the site to ensure that contracted staff are aware of the risks and adhere to the procedures which pertain to them. It is recommended that company/site induction processes should take this into account and it should be documented that the contractor has understood their obligations.



## 8 Milk Collection and Transport

### 8.1 Preparation of Tankers

#### 8.1.1 Raw Milk Spillage Management

Dairy industry transport and processing organisations must implement controls to prevent the spillage of raw milk during loading, transport, discharge and storage and provide a system of loading control, to ensure that maximum capacities are not exceeded.

#### 8.1.2 MAFBNZ Movement Permit

All tankers collecting and transporting milk within the Controlled Area (CA) will need to carry a valid MAFBNZ movement permit.

The conditions for the MAFBNZ movement permit may include, but are not limited to, disconnection of sampling devices, cleaning and disinfection of the tanker exterior and interior of the cab, and verification of the tanker loading control system to prevent milk spillage before departure from the site.

The internal tanker surfaces shall also be cleaned and sanitised if the tanker is to move out of the CA.

The MAFBNZ movement permit is issued for each tanker for one 24 hour period and is re-validated for each trip and shall be surrendered to the SRO at the end of the 24 hour period (Refer to section 6).

### 8.2 Milk Collection

It is likely that milk will not be able to be collected from a Restricted Place as the premises will be sealed from entry. Disposal of milk on-farm will need to be carefully controlled and must be under the direction of an Authorised Person.

#### 8.2.1 Farm Stock Control

Dairy companies shall provide a method for advising their suppliers to ensure livestock are kept off tanker tracks and roadways during a response. Where this is unavoidable, controls must be put in place to avoid contamination of the tanker wheels by faeces etc.

## 8.2.2 High Risk Farms

To avoid spreading the risk organism to low risk farms, restrictions shall be placed on the collection of milk by the CTO from High Risk farms. Options are;

- No milk collection from High Risk farms during a response, or;
- Milk from High Risk farms could be collected by a dedicated tanker or last pickup on a collection run and processed at one site in the CA.

## 8.2.3 Milk Collection

Tanker operators shall:

- Abide by conditions stipulated on the MAFBNZ movement permit
- Adhere to collection schedules and route instructions attached to the MAFBNZ movement permit
- Ensure the identity of High Risk properties
- Manage tankers and trailers to prevent the spillage of raw milk
- Be alert for any notices or signs indicating that an OIE list disease is suspected and shall not enter properties where there is any indication that the disease may be present
- Tanker operators shall wear waterproof clothing and boots while on High Risk farms
- Restrict movements and contact while at the farm dairy, and avoid direct contact with switches or equipment that cannot be sanitised
- Collection volumes should be recorded but raw milk samples must not be taken
- On completion of pump-out, the tanker operator shall decontaminate all connections and equipment that have been in contact with the tanker hose or have been handled
- Before getting back into the tanker, waterproof clothing, boots and hands shall be sanitised. In addition, external parts of the tanker including wheels, shall be sanitised if they have contacted milk spills or faeces
- Any milk spillage that is beyond the sanitising resources of the tanker driver's equipment, shall be reported to the company Transport Manager and SRO for follow-up action.

### **8.3 Tanker Decontamination**

The external surface of the tanker includes the cab, tank, walkways and undercarriage which shall be cleaned to remove all obvious soiling. Standard procedures shall be used for cleaning internal tanker surfaces, but shall be consistent with the Risk Organism Response Plan C&D schedule to ensure effectiveness for the specific risk organism.

However, if the tanker is to move outside the CA, a full CIP will be required before a MAFBNZ movement permit can be issued.

## 9 Milk Reception and Storage

### 9.1 Clean-Up

The Milk Reception Area is a High Risk area.

All raw milk is assumed to be contaminated and shall be handled by personnel familiar with sanitising requirements to ensure effective inactivation of the risk organism.

Milk spills shall be sanitised immediately.

All cleaning and sanitising shall involve the use of cleaning chemicals and sanitisers recommended for use during a response.

Reference – Appendix 3

### 9.2 Raw Milk Storage

Where the dairy industry can implement controls that will prevent the risk of milk spillage during loading, discharge and storage, no other control will be required. The company must be able to demonstrate to the SRO the mechanism or system that will prevent milk spillage.

### 9.3 Milk or Milk By-Products received from a Restricted Place (RP)

Where raw milk or by-products of milk originating from a RP has been received, the decision on how to treat the milk shall be made by the SRO in consultation with the Response Plan Co-ordinator and the ILO.

Similar actions may be considered for milk from High Risk farms.

## 10 Milk Treatment and Process Control

### 10.1 Heat Treatment or pH Treatment Requirements

*All raw milk and untreated milk derivatives, e.g. cream, intended for human consumption or animal feed, shall be processed to a minimum time-temperature combination or a pH change that will ensure sufficient destruction of the risk organism to acceptable levels as defined in Appendices I and II.*

#### 10.1.1 Milk and Dairy Products Intended For Domestic Consumption

Liquid milk, milk derivatives and dairy products intended for human consumption or for animal feed in New Zealand, shall be pasteurised to the OIE standard for “Double HTST” e.g. a minimum of 72°C/30 seconds or equivalent. e.g:

- 72°C for at least 30 seconds
- 73.4°C for at least 20 seconds
- 74.7°C for at least 14 seconds
- 75.9°C for at least 10 seconds
- >84.2°C for at least 1 second

*Note: These requirements are specific to FMD.*

#### 10.1.2 Milk and Dairy Products intended For Export

Consistent with the MAF Import Health Standard for the heat treatment of dairy products imported from countries that have had an FMD outbreak (e.g. UK & Cyprus).

It is recommended that dairy processors intending to export dairy products should also be prepared to implement the “Double HTST” standard during a response.

The current heat treatment standard for milk and milk derivatives processed into dairy products to be exported from New Zealand shall be in accordance with criteria specified in DPC3.;

- 69.4°C for at least 1 minute
- 63°C for at least 30 minutes
- 81.7°C for at least 1 second

Cream - shall be processed to a minimum of 75°C/15 seconds or an equivalent time and temperature combination.

For Animal Feed - milk or milk products intended for animal feed shall be heat treated to UHT or double HTST; i.e. 72°C/30 seconds or equivalent.

### **10.1.3 pH Treatment (Acidic/Alkaline) – Waste/Loss Streams**

Where environmental controls are implemented to the satisfaction of the SRO and where the milk, or milk product derivatives are subjected to a pH of less than or equal to 5, or greater than or equal to 11, for a minimum of 30 minutes or approved equivalent during processing, the product may be defined as "treated" e.g. cottage cheese, yoghurt, acid casein and acid whey.

### **10.1.4 Heat and pH Treatment Systems Evaluation**

The heat treatment and pH equipment and systems that dairy processing sites plan to use during a response for the treatment of milk, milk derivatives and dairy products must be evaluated by an approved Recognised Agency heat treatment evaluator for conformance to the above requirements.

The validation status of the heat treatment equipment or pH control systems that will be used to produce treated product during a response, shall be evaluated by the SRO.

## **10.2 Cleaning and Environmental Control**

The following cleaning and environmental control requirements shall be implemented to the satisfaction of the SRO before the manufacture of "treated" product commences:

- Personnel shall be informed of movement restrictions, control and decontamination procedures for each processing, packing and storage area and amenities.
- Footbaths and/or clothing exchanges shall be in place.
- The milk treatment environment shall be thoroughly cleaned and sanitised.

- All wet process equipment used in the manufacture of treated product shall be cleaned and sanitised externally and shall be cleaned and sanitised internally if infected milk has been processed.
- The processing environment shall be maintained to industry standards with additional cleaning at the discretion of the SRO.
- Cooling towers shall be sanitised where there is a risk of contamination from raw milk.
- Dry processing areas and equipment shall be “dry” cleaned. The SRO will advise if fumigation is necessary.

### 10.3 Process Control

The following process control systems shall be maintained during a response:

- A clear cut-off between treated and untreated milk and milk product derivatives shall be established to enable identification.
- Where appropriate, equipment shall be secured to minimise the discharge of milk spills and residues during processing, e.g. de-sludging separators and balance tanks.
- Product re-work or re-blending shall cease unless authorised by the SRO.
- Testing of in-process raw milk samples and raw cream samples shall be performed in the raw milk/raw cream processing areas or by an approved process documented in the site specific Risk Organism Response Plan.
- Environmental pathogen surveillance sampling shall be suspended until further notice.
- Product shall be traceable to the date of milk collection, farms of origin, date of manufacture and details of treatment.
- All untreated product waste streams shall be sanitised, incinerated or buried to the satisfaction of the SRO (separator sludge, product scraps, waste from floors and drains etc).
- Storage facilities shall be arranged to ensure the clear identification and segregation of safe, treated and untreated product in store – this should be consistent with product quarantine and segregation procedures specified by the Risk Management Programme.

## **10.4 Post Treatment Contamination or Environmental Control Failure**

If there is any risk that "treated" milk, milk derivatives or dairy products recontamination may have occurred after the heat or pH treatment step, the SRO shall be informed. Where this occurs, the product may be designated as "untreated" product and segregated accordingly.



# 11 Product Identification, Segregation, Storage and Distribution

## 11.1 Product Identification

All dairy products shall be clearly identified and traceable to the farm from which the milk originated and the date of collection. Details of the treatment and process control for each lot of milk product manufactured shall be maintained.

Contaminated and suspect product shall be identified and placed on hold or disposed of under the direction of the SRO.

## 11.2 Product Categories

The risk organism status of product shall be defined into one of the following three categories:

- **"Treated"** Product that complies with the heat or pH treatment and environment control requirements for a specific risk organism.
- **"Safe"** Product that is deemed free of the risk organism. This includes product that has been processed up to 14 days prior to notification of the response or for as many days as CTO may stipulate.  
Some risk organisms do not pass through the infected animal into the milk supply.
- **"Suspect or Untreated"** Product manufactured before the implementation of the organism management strategies. This includes product processed up to 14 days prior to the response or any period determined by CTO.

## 11.3 Product Segregation and Storage

Clear identification of "treated" and "untreated" product shall be established, and be maintained throughout processing and storage.

## 11.4 Product Distribution

All dairy products manufactured within a Controlled Area intended for distribution or transfer, will need a MAFBNZ movement permit provided by the SRO for each consignment.

Only products that comply with the requirements for treated products will be permitted for distribution out of the CA, unless otherwise approved by the CTO. e.g.: where storage is limited and product needs to be transferred to stores outside the CA.

## 12 Cleaning and Sanitising Requirements

*Only cleaning chemicals and sanitisers detailed in Appendix 3 shall be used as disinfectants during a response unless approved by the SRO.*

*As some risk organisms are highly contagious, the importance of cleaning and sanitising or disinfection can not be over-emphasised.*

*Accurate control of the concentration of materials used for sanitising is essential to ensure maximum efficiency.*

### 12.1 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 their use.

While many of the cleaning chemicals and sanitisers listed are commonly used in the dairy industry, other proprietary cleaning chemicals and sanitisers not listed may also be used in response to specific risk organisms at the discretion and approval of the SRO.

### 12.2 Sanitising Procedure

The sanitising procedure involves covering the surface or soaking the material with the appropriate sanitiser. Ensure the optimum pH and contact time is obtained specific for the treatment of the risk organism involved.

The Risk Organism Response Plan should specify procedures for the correct method of sanitising and decontamination of:

- Milk spills and product wastes.
- Tanker surfaces, processing equipment, building walls, floors, tools and sensitive surface areas, e.g. switches.
- Footwear.
- Waterproof clothing.

- Outer clothing, e.g. overalls.
- Product and environmental surveillance samples.

## 13 Laboratory Control

The following environment controls must be implemented in the processing site laboratories:

- All areas of the laboratory (floors, walls, benches) and equipment which may have come into contact with raw milk or untreated milk product derivatives shall be cleaned and sanitised.
- Personnel shall be informed of movement restrictions, control and decontamination procedures for entering the laboratory, processing areas and amenities.
- After completion of analysis untreated product and process control samples collected prior to the response, shall be sterilised and then disposed of. Analysis of untreated samples must be completed before the laboratory equipment is cleaned and sanitised.
- Environmental surveillance samples collected within 14 days prior to the response shall be sterilised and disposed of appropriately.
- No raw milk, untreated milk or untreated milk product derivative sample handling or testing shall be performed in the laboratory once organism management strategies have been implemented as consistent with the Risk Organism Response Plan and to the satisfaction of the SRO.

# 14 Dairy Effluent Treatment and Disposal

## 14.1 Exemptions

The following processing and effluent control situations are considered very low risk and are exempt from the treatment requirements in this section:

- Effluent that is discharged directly into a municipal sewer or through enclosed pipes to the sea or into a river with its mouth close to the sea.
- Waste derived from treated product manufacture is low risk and may not require further treatment, e.g.: whey or permeate from pasteurised milk.
- Effluent that is already subjected to very high or very low pH streams (CIP) and is not mixed with effluent from High Risk areas. Daily records must be kept which verify pH ranges are consistently complied with.
- Effluent proven to contain less than 0.05% raw milk may also be exempt from pH adjustment providing the dilution in the effluent is considered low risk.
- Effluent from self-contained farm house/factory operations does not require treatment providing it is disposed of on the same property.
- Or a combination of the above situations providing the systems are assessed as low risk by the RA as part of the Risk Organism Response Plan verification.

## 14.2 Dairy Effluent and Waste Treatment Control Requirements

The nature and origin of liquid wastes shall be pre-determined so that correctly controlled pH treatment can be applied quickly. Unless exempted as described above, the following control requirements shall apply:

- All effluent treatment areas are considered High Risk and access shall be controlled and restricted to designated personnel only.
- Effluent from all areas where raw and untreated milk or milk derivatives is stored or processed shall be adjusted to less than or equal to pH 5.0 or greater than or equal to pH 11.0 and held for a minimum of 30 minutes (or effective equivalent for the specific risk organism), before discharge, e.g.:

- i. Tanker washing and CIP areas
  - ii. Milk reception and milk treatment areas
  - iii. Processing areas where vacuators and evaporators treat raw milk/cream
- Condenser waters and cooling tower waters that could be contaminated by raw milk/cream shall be diverted for effluent treatment.
  - Effluent sampling devices shall be switched off unless required for pH monitoring.
  - pH of waste streams shall be monitored continuously during an incursion response.

### **14.3 Assessment of Effluent Treatment Systems**

During a response, the treatment process and implementation of environmental controls shall be implemented consistent with the verified Risk Organism Response Plan. Any deviation from the plan must be assessed by the SRO prior to commencement.

An evaluation of the risks involved with a particular disposal system maybe referred by the RA to MAFBNZ Incursion Investigator with expertise in epidemiology or virology.

### **14.4 Effluent and Waste Disposal Requirements**

Once the effluent control requirements listed in 10.1 and 10.2 have been followed, effluent may then be disposed of as per normal procedure.

Cloven-hoofed livestock shall not be grazed on any pasture sprayed with any dairy factory effluent for 14 days after spraying. If this cannot be adequately controlled, pastures should not be used for effluent disposal.

Spray irrigation equipment shall not be moved between farms.

A MAFBNZ movement permit will be required, for vehicles removing dairy factory effluent or waste products from dairy processing sites during a response.

## 14.5 Permit Conditions for Transporting Effluent and Waste Products

To enable a MAFBNZ movement permit to be issued for the transport of effluent and dairy wastes off site during a response, the following conditions will apply:

- The effluent and waste products must be managed consistent with the Risk Organism Response Plan procedures.
- The vehicles and equipment are cleaned and sanitised externally between trips
- Drivers shall be provided with waterproof clothing and boots for use on farms
- The vehicle shall be equipped with spray sanitiser units and container of sanitizer
- Drivers must sanitise clothing and footwear before they leave each farm if they have to get out of their vehicle, whether or not they believe they may have come into contact with fomites or conveyors
- The effluent/waste transport vehicles shall not enter High Risk farms or IP
- Effluent discharge vehicles shall not move between farms without returning to the effluent discharge centre for cleaning and sanitising and revalidation of the MAFBNZ movement permit.



# 15 Farm Servicing

## 15.1 Farm Visits

It is the responsibility of Farm Service Personnel to be aware of the risk status of all farms within the CA before entering.

### **Restricted Places:**

Farm Services personnel (including milk quality officers, refrigeration technicians, field representatives and outside contractors) shall be prohibited from entering restricted places during a response.

### **High Risk Farms:**

Farm Services personnel shall not enter High Risk properties unless absolutely necessary.

Waterproof clothing and boots shall be worn while on High Risk farms and shall be cleaned and sanitised before entering and leaving the property.

Farm service vehicles and equipment should not be taken onto High Risk farms unless essential to complete the service. The tyres and any part of the vehicle or equipment that may have been in contact with milk or animal wastes etc. shall be cleaned and sanitised before leaving the property.

### **Farms Situated within the Controlled Area:**

Farm Services personnel and outside contractors working within the CA shall wear waterproof clothing and boots while on farms. They will need to carry a sanitising spray unit for sanitising their waterproof clothing and boots when leaving farms in the CA.

Movements on the property shall be restricted to minimise contact with equipment, milk and animals.

Vehicles and equipment that have been in contact with milk or animal wastes etc shall have the contaminated parts sanitised before leaving the property, in accordance with procedures in the Risk Organism Response Plan.

During a response the SRO shall be advised where outside contractors are employed by companies to service farms, e.g. refrigeration repairs.

Farm service vehicles that have entered farms in the CA shall be cleaned and sanitised externally on return to site and prior to leaving the CA.

## 15.2 Entry and Egress from the Factory Site

Farm services vehicles shall enter the site via a controlled designated entry point and surrender the **expired MAFBNZ movement permit**

(Refer to the conditions for effluent transport in 14.5).

After visiting farms in a CA, farm services personnel shall shower and change into clean clothing before resuming on-site duties.

# 16 Traceback

## 16.1 Traceback Requirements

A traceback investigation will be required to identify all possible avenues by which the risk organism has potentially been spread through milk collection, transfer, processing, storage, distribution and effluent disposal. These may be needed for up to 14 days prior to the response being declared or as advised by the SRO.

The following records shall be required by the SRO for traceback purposes:

- a. Milk Collection  
An accurate record of the route and collection sequence taken by each vehicle (tanker and/or train), and the names of the drivers.
- b. Milk and Milk By-Product Transfers  
A list of all inter-site transfers of liquid milk products, e.g. milk, cream, skim, permeate and whey.
- c. Dairy Product Distribution  
A list of all processed products that have left the site, their destination and details of transport.
- d. Raw Milk Samples  
A record of off-site milk testing laboratories that have received raw milk samples and the method of transport and disposal of sample waste.
- e. Product and Environmental Surveillance Samples  
A list of where and how product and environmental surveillance samples have been sent.
- f. Company Staff  
A record of the names and residential addresses of all staff both permanent and casual.  
This shall also include a record of all staff who own, keep or who are in contact with farm animals, e.g.: relief milking, calf-rearing and pig feeding etc.
- g. Effluent Disposal  
A list of farms visited by effluent disposal trucks, dates, delivery sequence and drivers.
- h. Farm Services  
A list of farms visited by farm services, farm assessors, vehicles, dates, work carried out and site personnel involved in each visit.

i. Waste Removal Services

A list of the organisations and contractors who have collected waste materials, scraps and rubbish, especially pig farmers who collect waste or rejected dairy products.

# 17 Dairy Risk Organism Response Planning

## 17.1 Purpose

This section outlines the process for preparation of a Risk Organism Response Plan to demonstrate a dairy company's ability to respond effectively to a risk organism response.

## 17.2 Scope

A Risk Organism Response Plan and associated procedures are required by all organisations that collect process or distribute raw milk. The plan should include the following activities:

- Movement control
- Site and Personnel control
- Milk collection and discharge
- Milk reception and storage
- Milk treatment and processing
- Product identification, segregation and storage
- Decontamination - Cleaning and sanitising requirements
- Laboratory control
- Effluent treatment and disposal
- Farm servicing
- Traceback.

# 18 Risk Organism Response Plan

## 18.1 Dairy Risk Organism Response Plan Preparation

The development of a documented Risk Organism Response Plan for each dairy processing site and verification of the plan by the RA, should ensure that the site is able to respond quickly and effectively. A rapid response will be essential to prevent spreading the organism through the collection, processing and distribution of milk and dairy products.

The procedures contained in the Risk Organism Response Plan will be the documented systems nominated by each site to meet the outcomes specified in this guideline. It is acknowledged that some of the procedures will be consistent with those which already form part of the company's RMP.

*The Risk Organism Response Plan will need to include:*

- Documented procedures describing how the controls and technical requirements specified in this guideline will be implemented.
- Names and responsibilities of resource (personnel and material) requirements.
- Detailed information about systems critical to the control of risk organisms (including modification requirements and checks).
- Detailed information about cleaning and sanitising chemicals which are available for the control of risk organisms (including type of chemical, treatment parameters, modifications to standard operating procedures).
- Site plan showing controlled entrances, movement of personnel/ and vehicles around the site, High Risk areas and allocated amenities.

## 18.2 Recognised Agency Support

The Recognised Agency allocates personnel to processing sites as necessary to ensure the development and verification of site specific Risk Organism Response Plans and documented procedures. Services and support provided during the preparedness phase is on a cost recovery basis.

## 18.3 Dairy Industry Risk Profile

A risk profile has been developed for the dairy industry. This identifies and profiles risk within normal dairy processing operations – including milk collection and transport. This forms Appendix 4 and should be considered when developing site specific Risk Organism Response Plans. Note: the risk profile has been modelled using FMD and although common risk mitigation principles apply, this should also be taken into consideration to ensure that procedures are not limited to FMD.

## 18.4 Response Management Plan

The points listed below give an example of what a typical plan should contain. The list of items to be covered should not be considered as exhaustive – site and company specific differences occur and will need to be taken into consideration. NZFSA has developed a template which can be used to develop site specific plans. This guideline should be consulted when completing the template.

A suggested format for a site response plan is:

1. Site characteristics
  - Location, name, contact details, milk collection area, volume of milk processed, products manufactured, special features (e.g. receipt of milk or other products from other sites).
  - Map showing how separation between raw and processed milk handling areas is achieved.
2. Risk organism Risk Organism Response Planning
  - a. Staff training and awareness of preparedness & response
  - b. Organisational structure
  - c. Lines of communication between NZFSA/MAFBNZ, the RA, staff & suppliers
3. Site response plan
  - a. Cessation of production and processing if required
  - b. Disposal of product
  - c. Milk collection and transportation;
    - MAFBNZ movement permits
    - Collection from Infected zones
    - Collection from the IP

- Inter-site transfer of milk and milk products
- Exposure pathways
- d. Sample management
- e. Tanker cleaning
- f. Tanker drivers
- g. Accidents and spills
- h. On-farm requirements;
  - Animals off tanker tracks
  - Animals not in shed or adjacent to tanker track during milk collection
- i. Milk processing
  - Disposal of waste/effluent
  - Cleaning and disinfection plan
    - Identification of areas requiring cleaning and disinfection
    - Plan for cleaning and disinfection
  - Animals on farms adjacent to processing site
    - Communication with owners/managers
  - Movement of equipment on or off site, (staff, contractors, visitors)
  - Aerosols
- j. Records
  - Tankers and/or trains: farms visited, pick-up sequence, vehicle cleaning
    - Inter-factory product movements
    - Driver ID
  - Products (human consumption and stockfood)
    - Traceable to date and time of manufacture
    - Records of heat and other treatments
    - Stock control/recall procedures



- Waste and effluent - recipients of effluent or waste that could be used for stock food
  - Collection records
  - Type, quantity of product collected
  - Disposal method/end-use and location
- Human Resources
  - Training records (risk organism response)
  - Record of staff that have contact with farm animals outside work.

## Appendices

# 1 Appendix 1 – OIE Listed Risk Organisms of Significance to the New Zealand Dairy Industry

## 1.1 Verification

### 1.1.1 Purpose

Verification of the Risk Organism Response Plan is required at a frequency of at least annually. This activity should be undertaken in conjunction with regular APA regulatory audit visits. The outcome of the verification will be reported to NZFSA and where plans are found to have deficiencies, the RA will issue non-compliances. Appropriate corrective action is expected.

Sites with robust Risk Organism Response Plans will be more likely to be permitted to continue processing in the event of a response.

Regular verification is necessary for NZFSA and MAFBNZ to have current knowledge and overall appreciation of industry preparedness.

### 1.1.2 Responsibilities

Dairy Site Management (including the Site Response Plan Co-ordinator) is responsible for ensuring that the plan is kept current and that non-compliances are followed with appropriate corrective action.

**RISK ORGANISMS OF SIGNIFICANCE TO THE NEW ZEALAND DAIRY INDUSTRY**

<b>Name of disease and dairy species affected</b>	<b>Present in raw unprocessed milk</b>	<b>Treatments to inactivate disease agent so that products can be used for livestock feed</b>
Foot and mouth disease Ruminants	Yes	Double HTST (72°C for 30 seconds), HTST or UHT (130-132°C for 1-2 seconds) combined with another physical treatment e.g. maintaining pH below 6.0 for 1 hour or additional heating to 72°C combined with desiccation. (OIE requirement)
Vesicular stomatitis Ruminants	Yes	HTST pasteurisation
Rinderpest Ruminants	Yes	HTST pasteurisation
Peste des petits ruminants Sheep, Goats	Yes	HTST pasteurisation
Contagious bovine pleuropneumonia Cattle	Yes	HTST pasteurisation
Lumpy skin disease Cattle	Yes	HTST pasteurisation
Rift Valley fever Ruminants	Yes	HTST pasteurisation
Bluetongue Ruminants	No	NA - raw milk does not present a risk
Sheep pox and goat pox	Yes	HTST pasteurisation

Name of disease and dairy species affected	Present in raw unprocessed milk	Treatments to inactivate disease agent so that products can be used for livestock feed
Sheep, Goats		
Anthrax Sheep, Goats, Cattle	Has been isolated in milk.	Vegetative bacteria can be inactivated by pasteurisation, but not spores. WHO recommends that milk from affected or suspected herds be discarded and destroyed.
Aujeszky's disease Ruminants	Yes (pig milk only)	Ruminants are dead-end hosts. Milk products do not present a risk.
Echinococcosis / hydatidosis Cattle, Sheep, Goats	No	NA - raw milk does not present a risk.
Heartwater Cattle, Sheep, Goats	No	NA - raw milk does not present a risk.
Leptospirosis (exotic species) Cattle, Sheep, Goats	Yes	Processed milk products do not present a risk i.e.: milk can be processed in any way such as drying. Pasteurisation is not required before feeding to livestock.
Q fever Cattle, Sheep, Goats	Yes	HTST pasteurisation.
Rabies Cattle, Sheep, Goats	Yes	Spread by milk extremely rare. Processed milk products do not present a risk.
Screw-worm (Old World and New World) Cattle, Sheep, Goats	No	NA - raw milk does not present a risk.

Name of disease and dairy species affected	Present in raw unprocessed milk	Treatments to inactivate disease agent so that products can be used for livestock feed
Anaplasmosis Ruminants	No	NA - raw milk does not present a risk.
Babesiosis Cattle, Sheep, Goats	No	NA - raw milk does not present a risk.
<i>Brucella abortus</i> Cattle	Yes	HTST pasteurisation.
Bovine cysticercosis Cattle	No	NA - raw milk does not present a risk.
Acute haemorrhagic Septicaemia Ruminants	Yes	Processed milk products do not present a risk.
Infectious bovine rhinotracheitis (exotic strains) Cattle	No	NA - raw milk does not present a risk.
Theileriasis Cattle	No	NA - raw milk does not present a risk.
Trypanosomiasis Cattle, Sheep, Goats	No	NA - raw milk does not present a risk.
Bovine spongiform Encephalopathy Cattle	No	NA - raw milk does not present a risk.

Name of disease and dairy species affected	Present in raw unprocessed milk	Treatments to inactivate disease agent so that products can be used for livestock feed
<i>Brucella melitensis</i> Cattle, Sheep, Goats	Yes	HTST pasteurisation.
Contagious agalactia Sheep and Goats	Yes	Processed dairy products do not present a risk.
Contagious caprine pleuropneumonia Goats	Yes	HTST pasteurisation.
Enzootic abortion of ewes Sheep	Yes - milk can be contaminated by abortion secretions flowing on to udder.	Processed dairy products do not present a risk.
Pulmonary adenomatosis Sheep	Yes	Processed dairy products do not present a risk.
Nairobi sheep disease Sheep	No	NA - raw milk does not present a risk.
<i>Salmonella abortus ovis</i> Sheep	Yes	HTST pasteurisation
Scrapie Sheep	No	NA - raw milk does not present a risk.
Maedi-visna Goats	Yes	Processed dairy products do not present a risk.

## **2 Appendix 2 – International Animal Health Code Heat Treatment Requirements for Human Consumption and Animal Feed**

Ref: OIE Terrestrial Animal Health Code, Part 3, Section 3.6, Chapter 3.6.2, Article 3.6.2.5 and 6.

### **2.1 FMD Virus: Destruction Requirements**

For the inactivation of FMD virus present in milk and cream, one of the following procedures should be used:

#### **2.1.1 Milk or Cream for Human Consumption**

1. Ultra-high temperature (UHT = minimum temperature of 132°C for at least 1 second).
2. If the milk has a pH less than 7.0, simple high temperature - short time pasteurisation (HTST 72°C for 15 seconds).
3. If the milk has a pH of 7.0 or over, double HTST.

#### **2.1.2 Milk for Animal Consumption**

1. Double HTST (72°C for at least 30 seconds).
2. HTST combined with another physical treatment; e.g. maintaining a pH < 6 for at least 1 hour or additional heating to at least 72°C combined with desiccation.
3. UHT combined with another physical treatment referred to in 2.1.1 number 2 above.

## 3 Appendix 3 – Decontamination – Operational Guideline

### 3.1 Introduction

Decontamination is the combination of physical and chemical processes that kills or removes organisms and is vital for risk organism eradication. Thorough decontamination involves close cooperation between all personnel involved in the cleaning and disinfection process and 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 viral diseases. This is reflected in the recommendations provided.

Identification of the risk organism is fundamental for designing an appropriate decontamination strategy. A sound understanding of the agents biological properties and how it spreads will form the basis for the specific strategy. Importance is placed on the adoption of the basic microbiological principles of isolation of 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 decontamination.

Procedures described may appear simple and tedious, however, persistence and attention to detail is vital for successful elimination of the risk organism.

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. Consequently, disinfectants are recommended that are generally available in large quantities.

*Note: Common chemical names are used because they are easily understood by all personnel with basic scientific knowledge. Clear instructions are given for the dilution and application of these disinfectants (see Table 4).*

### **3.1.1 How to Use This Section**

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

- to check the best type of disinfectant for viruses specific to the dairy industry 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 Table 3
- to check the concentration and dilution of disinfectants see Table 4
- to check safety concerns see Table 5.

## **3.2 Know the Enemy**

In order 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 to infect other animals.

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

### 3.2.1 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**

Risk organism family	Diseases	Dairy Species affected	Transmission	Category of risk organism <sup>1</sup>
<i>Bunyaviridae</i>	Rift Valley Fever Nairobi sheep disease	Ruminants Sheep, Goats	Insect vectors Insect vectors	A
<i>Flaviviridae</i>	Wesselsbron disease	Ruminants	Insect vectors	A
<i>Paramyxoviridae</i>	Rinderpest	Ruminants	Aerosols, ingestion	A
<i>Picornaviridae</i>	Foot & Mouth disease <sup>2</sup>	Ruminants	Aerosols, ingestion	B
<i>Poxviridae</i>	Sheep/Goat pox	Sheep & Goats	Contact, insect vectors	A
<i>Reoviridae</i>	Bluetongue	Ruminants	Insect vectors	C
<i>Retroviridae</i>	Maedi visna Pulmonary adenomatosis	Sheep, goats Sheep, goats	Contact Contact	A
<i>Rhabdoviridae</i>	Vesicular stomatitis	Ruminants	Insect vectors	A
<i>Prions</i>	Scrapie BSE	Sheep, goats Cattle	Contact (prenatal/perinatal) Ingestion	Special inactivation necessary <sup>3</sup>
<i>Bacillaceae</i>	Anthrax	Sheep, Goats, Cattle	Ingestion, contact	<sup>3</sup>
<i>Togaviridae</i>	Classical swine fever	Ruminants	Contact, ingestion	A

## KEY

1. Category A – best disinfectants are detergents, hypochlorites, alkalis, Virkon®, glutaraldehyde  
Category B – best disinfectants are hypochlorites, alkalis, Virkon®, glutaraldehyde;
  - Acids effective for FMD virus
  - classical bactericides like QAC's & phenolics are NOT effective against these virusesCategory C – these viruses fall between Cat A & B in sensitivity to the best disinfectants such as hypochlorites, alkalis, Virkon®, glutaraldehyde
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 4*

### **3.2.2 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 2 – Disinfectant/Chemical Selections for Particular Disease Agents**

Risk Organism name	Environment	Personnel	Electrical equipment	Water – tanks	Water - dams	Waste/Loss streams	Machinery/ vehicles	Clothing
Category C <b>Bluetongue</b>	Decrease insect vector habitats	1	N/A	Decrease insect vector habitats	Decrease insect vector habitats	Bury or 6a or 6b to prevent insect breeding	6a or 6b for vehicle disinfection if necessary	1
Non-viral – prions <b>BSE &amp; Scrapie</b>	1 then 2a	See BSE or Scrapie disease strategies	N/A	N/A	N/A	Bury or burn	2a	Burn if heavily contaminated
Category B <b>FMD</b>	3	1, 4b	5c	3	3	Bury or 4	2c, 3, 4	2, 2c, 3, 4b
Category A <b>Lumpy Skin Disease</b> <b>Sheep &amp; Goat Pox</b>	2 or 3 or 4b	1, 2, 3b, or 4b	5c	Decrease insect vector habitats	Decrease insect vector habitats	Bury and 6a or 6b for insect control	1 followed by 2, 3 or 4b	Destroy if not valuable, or 2, 3 or 4b
Category A <b>Peste des petits ruminants</b> <b>Rinderpest</b>	2 or 3	1, 2c or 4b	5c	Drain to pasture where possible	Drain to pasture where possible	2, 3, 4 then bury	1 (to clean) followed by 2a, 2b, 2c or 3 if necessary	1 (to clean) followed by 2a, 2b, 2c or 3 if necessary
Category A <b>Rift Valley Fever</b>	2 or 4 and insect control 6a or 6b	2c or 4b	5 if necessary	Decrease insect vector habitats	Decrease insect vector habitats	Drain to pit/bury and 6a or 6b for insect control	1 (to clean) followed by 2 or 4	1 (to clean) followed by 2 or 4
Category A <b>Vesicular stomatitis</b>	6a	1	5c	Drain to pasture where possible; decrease insect vector habitat	Drain to pasture where possible; decrease insect vector habitat	Bury or 6a	6b (to kill insects) 1 (to remove virus)	6b (to kill insects) 1 (to remove virus)

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 Na<sub>2</sub>CO<sub>3</sub> or washing soda Na<sub>2</sub>CO<sub>3</sub>.10H<sub>2</sub>O)
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

### 3.2.3 Epidemiological Consideration affecting Decontamination Procedures for Particular Risk Organisms

The following tables summarises the epidemiological factors affecting the extent of procedures which should be employed in removing the specific infective agent

**Table 3.1 - Epidemiological considerations – Bluetongue**

ORGANISM FEATURES	EPIDEMIOLOGY	COMMENTS
General Properties	<p>Arthropod-borne viral disease mainly of sheep, goats and deer.</p> <p>REOVIRIDAE (Category C virus), 24 serotypes comprising countless strains of varying virulence.</p> <p>Infection of cattle, through subclinical, is of great epidemiological significance</p>	There are no requirements for any procedures to be employed
Arthropod vectors	<p>Disease is transmitted by <i>Culicoides spp.</i> Insects but is NOT a contagious disease in terms of spreading from animal to animal.</p> <p>Cattle are the main amplifying hosts</p>	Disinsection would be impractical in most circumstances
Airborne spread	Disease could move to new areas with aerial drift of infected insects	
Wildlife	Feral goats and deer could maintain a reservoir of infection	
Zoonosis	Humans are not affected	

**Table 3.2 - Epidemiological considerations – Bovine Spongiform Encephalopathy (BSE) & Scrapie**

ORGANISM FEATURES	EPIDEMIOLOGY	COMMENTS
General Properties	<p>A transmissible spongiform encephalopathy of cattle (BSE) and sheep &amp; goats (Scrapie) caused by and unconventional agent</p> <p>PRION (Special inactivation required)</p> <p>Most common disinfectants are not effective against the BSE or Scrapie agents</p>	

Incubation period	<p>BSE; Prolonged, most cases occur in cattle aged between 3 and 7 years</p> <p>Scrapie; Prolonged incubation, occurs most frequently between 2 – 5 years in sheep with a peak incidence of 3.5yrs in sheep and somewhat less in goats</p>	OIE Code does not specify a maximum incubation period
Transmission	<p>BSE; Ingestion of meat meal contaminated with high concentrations of the BSE agent</p> <p>Scrapie; Primarily from ewe/doe to offspring probably via contaminated uterine fluids</p>	
Airborne spread	Not applicable	
Persistence in the environment	<p>Can persist for very long periods in the environment and in a desiccated state</p> <p>Scrapie; some infectivity remains after exposure to dry heat for 24hrs at 160°C</p>	
Wildlife	<p>BSE; Spongiform encephalopathies have been reported in antelopes in British Zoos and in large &amp; small cats</p> <p>Scrapie; Not applicable</p>	
Arthropod vectors	Not applicable/no documented evidence	
Zoonosis	There is no evidence that the BSE or Scrapie agents are transmissible to humans	

**Table 3.3 - Epidemiological considerations – Foot and Mouth Disease (FMD)**

<b>ORGANISM FEATURES</b>	<b>EPIDEMIOLOGY</b>	<b>COMMENTS</b>
General Properties	<p>Highly contagious, viral, vesicular disease of cloven-hoofed animals.</p> <p>PICORNAVIRIDAE (Category B virus) 7 serotypes with 60+ subtypes</p> <p>The virus is varyingly stable at pH 6.7 – 9.5; rapidly inactivated below pH 5 and above pH 11</p> <p>The virus is stable at low temperatures and when relative humidity is &gt;60%</p> <p>The virus is moderately susceptible to ultraviolet light and rapidly inactivated at temperatures &gt;50°C</p>	<p>See disinfectants applicable to Category B viruses.</p> <p>Acid/Alkali and chlorine based disinfectants can be used (care must be taken that they are not mixed or used together)</p>

Incubation period	Incubation period usually 3-5 days  FMD virus is excreted 1-5 days prior to clinical signs depending on incubation period	Decontamination procedures are determined by and incubation period of 14 days (OIE Code)
Transmission	Virus is excreted from nasal passages, saliva, milk, semen, faeces, urine and in vast amounts from ruptured vesicles.  Pigs excrete up to 3000 times more virus than other animals  The disease is rapidly spread by direct contact especially at sale yards  Cattle remain carriers for at least 27 months, sheep for 9 months but pigs are not long-term carriers	All procedures listed should be observed. Personal decontamination is important.
Airborne spread	Can be extremely widespread over long distances if conditions are right. Cattle are usually the indicator since they ventilate 10 x more air than other species	
Persistence in the environment	FMD virus may remain infective in the environment for several weeks, possibly longer in the presence of soil, manure, dried animal secretions, straw, hair and leather	
Persistence in products	FMD virus is inactivated in 'setting' meat (not pig meat) but is not inactivated in offal, bone marrow, lymph nodes and blood clots  FMD virus survives in salted/cured meats, hides, milk, dairy products, wool & semen	These factors determine the extent of operations following tracing of stock
Wildlife	Feral and wild animals have potential to be an important risk in perpetuating or disseminating FMD virus	
Arthropod vectors	Not applicable. Mechanical transfer could occur.	
Zoonosis	Rarely zoonotic. It is known to cause vesicles on the hands & lips  Human nasal passages can mechanically harbour the virus for 24-27hrs despite masks and nose blowing	If a person is affected they must not have contact with susceptible animals until cleared of infection.

**Table 3.4 - Epidemiological considerations – Rift Valley Fever (RVF)**

<b>ORGANISM FEATURES</b>	<b>EPIDEMIOLOGY</b>	<b>COMMENTS</b>
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General Properties	<p>An acute insect-borne viral disease affecting mainly ruminants and humans</p> <p>BUNYAVIRIDAE (Category A virus)</p> <p>Virus is very susceptible to acid pH and readily inactivated below pH 6.2. Most stable within pH 7-8</p>	See disinfectants applicable to category A viruses
Incubation period	Usually 2-6 days	Decontamination procedures are determined by an incubation period of 30 days (OIE code)
Transmission	Predominantly a vector-borne disease. Aerosol transmission is an important means of spread to humans as is contact with infected carcasses	
Airborne spread	Windborne dispersal of infected vectors is a means of spread of RVF	
Persistence in the environment	<p>The virus is destroyed by strong sunlight/UV radiation</p> <p>Stable in aerosol form at 24°C and relative humidities of 50 – 85%</p> <p>Can survive in dried blood for up to 3 months</p>	
Wildlife	Species most likely to harbour the virus are goats, Camels and buffalo	
Arthropod vectors	Major vectors are certain species of mosquitoes. Ticks and biting midges have also been implicated	
Zoonosis	Humans can be affected	

**Table 3.5 - Epidemiological considerations – Rinderpest/peste des petits (PPR)**

<b>ORGANISM FEATURES</b>	<b>EPIDEMIOLOGY</b>	<b>COMMENTS</b>
General Properties	Contagious generalised viral disease mainly of	See disinfectants

	<p>cattle (usually fatal)</p> <p>PPR mirrors Rinderpest in all aspects but is specific to sheep &amp; goats; Asian pigs are more susceptible to Rinderpest than European pigs</p> <p>PARAMYXOVIRIDAE (Category A virus)</p> <p>PPR virus is stable between pH 7.2 – 7.9 but is rapidly inactivated at pH values &lt;5.6 or &gt;9.6</p>	<p>applicable to category A viruses</p>
Incubation period	<p>2-6 days but may be as long as 15 days</p> <p>Virus appears in blood excretions and secretions 1-2 days prior to clinical signs</p>	<p>Decontamination procedures are determined by an incubation period of 21 days (OIE code)</p>
Transmission	<p>Transmission is via the respiratory tract and close contact. Virus present in saliva, faeces, urine, milk and products of abortion</p> <p>In the few animals that do recover, there is no carrier state as such but milk may be infectious 45 days after clinical recovery</p> <p>Disease transmitted by movement of cattle and indirectly by contaminated clothing and vehicles.</p>	<p>Suggest that preliminary disinfection and clean up only is done</p>
Airborne spread	<p>Is possible over several hundred metres, mainly at night. High &amp; low humidity aid survival but virus rapidly destroyed at RH 50-60%</p>	<p>No action is control measures in place</p>
Persistence in the environment	<p>Rinderpest/PPR virus is not very stable and does not survive more than 2-3 days</p> <p>Because of viral emission, stock yards could be contaminated</p> <p>Contaminated pastures would be non-infective after 6-24hrs depending on sunlight exposure</p>	
Persistence in products		
Wildlife	<p>Buffalo, feral cattle and probably deer depending on stock density and degree of contact. Feral (European) pigs should not present a problem</p>	
Arthropod vectors	<p>Not considered applicable</p>	
Zoonosis	<p>Humans are not affected</p>	

## **3.3 Weapons – Disinfectants/Chemicals for Inactivation of Risk Organisms**

### **3.3.1 Introduction**

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

### **3.3.2 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 associated with inanimate objects.

### **3.3.3 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 epidemiological 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, pipework 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 brushing 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.

Knowledge of the properties of the risk organism is crucial in planning a decontamination strategy. 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.

### 3.3.4 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 5 provides some basic information about precautions and contraindications when using the recommended disinfectants.

## 3.4 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 should be 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 QAC's are very effective antibacterials but have limited effectiveness against Category B&C virus and have therefore been excluded.*

### **3.4.1 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.

### **3.4.2 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. Its activity is based on a buffered synergised acid peroxygen system containing a high percentage of surfactant. 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.

### **3.4.3 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.

### **3.4.4 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.

### **3.4.5 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 in non-laboratory conditions, 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. A methodical and systematic approach based on first principles may have to be substituted. 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 (e.g.: from RC), and the contaminated equipment kept in quarantine until that time.

Table 4 shows which disinfectant should be used for inactivating each category of virus and what dilutions/concentration should be used.

**Table 4 – Recommended disinfectants and concentration for inactivation of viruses**

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



<b>Acids</b>					
Hydrochloric acid HCl	Conc. Liquid	1:50	2%w/v	10mins	Used only when better disinfectants are not available. Corrosive for may metals & concrete
Citric acid	Powder	2g/litre	0.2%w/v	30 <sup>5</sup> mins	Safe for clothing and personal decontamination. Especially useful for FMD virus decontamination
<b>Aldehydes:</b>					
Gluteraldehyde	Conc. Solution	As appropriate	2%w/v	10-30mins	Excellent disinfectant effective against virus categories A, B & C
Formalin	40% formaldehyde	1:12	8%w/v	10-30mins	Disinfectant releases irritating, toxic gas
Formaldehyde gas	Special generation required			15-24hrs	Toxic gas, recommended only if other methods of decontamination cannot be used

Notes:

1. Commonly used general disinfectants such as phenolics and QAC's are very effective antibacterials, but have limited effectiveness against Category B & C viruses and are not included for use.
2. 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 induce antiviral conditions by lowering 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 (milk/food). 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 5: 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*

DISINFECTANT	HEALTH ASPECTS	ENVIRONMENTAL PROBLEMS & CONTRAINDICATIONS
Hypochlorites	Toxic for eyes & skin	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.
Virkon	Reasonable care necessary	
Sodium hydroxide	Caustic for eyes & skin	Avoid contact with strong acids. Cannot be used on aluminium or like alloys.
Sodium carbonate	Mildly caustic for eyes & skin	Avoid us with aluminium and like alloys
Hydrochloric acid	Toxic for eyes, skin & respiratory passages	Corrosive for many metals and concrete. Avoid contact with strong alkalis.
Gluteraldehyde	Avoid eye & skin contact	
Formalin solution	Releases toxic gas; irritant for mucous membranes	
Formaldehyde gas	Very toxic for mucous membranes in concentrations as low as 2ppm	Cannot be used in the presence of water, hypochlorites or chlorides. Cannot be released into the atmosphere without neutralization. Corrosive to some metals.

## 4 Appendix 4 - Dairy Industry – Risk Profile

### Dairy Biosecurity Risk Profile

The objectives of defining a risk profile is to:

- define potential conveyors of risk organisms;
- identify biological pathways for exposure;
- rank the risk of amplification from each of these pathways;
- identify appropriate risk mitigation measures in the dairy industry.

The result is a prediction of traces that would arise from dairy processing during a response. The profile identifies risk pathways which should be considered when developing Risk Organism Response Plans.

Foot and mouth disease was chosen as there is considerable information available profiling how the virus behaves in milk and it is the most significant risk organism that is known to be transmitted in milk.

FMD virus characteristics have been evaluated to determine how much virus was excreted in milk, the survival of the virus in milk and milk products, transmission of virus in milk and milk products, and existing standards and recommendations.

Processes used for manufacture of milk products were examined to determine what impact they had on the amount of FMD virus in the milk. A table showing each of the processes examined and the number of kill steps for FMD virus in each was produced to determine relative safety in terms of transmission of FMD virus to susceptible animals. Waste/loss streams are shown in the table in italics at the step where they are removed to allow evaluation of risk for these products.

Conveyors are defined as a first step to identifying how these are involved in exposure pathways.

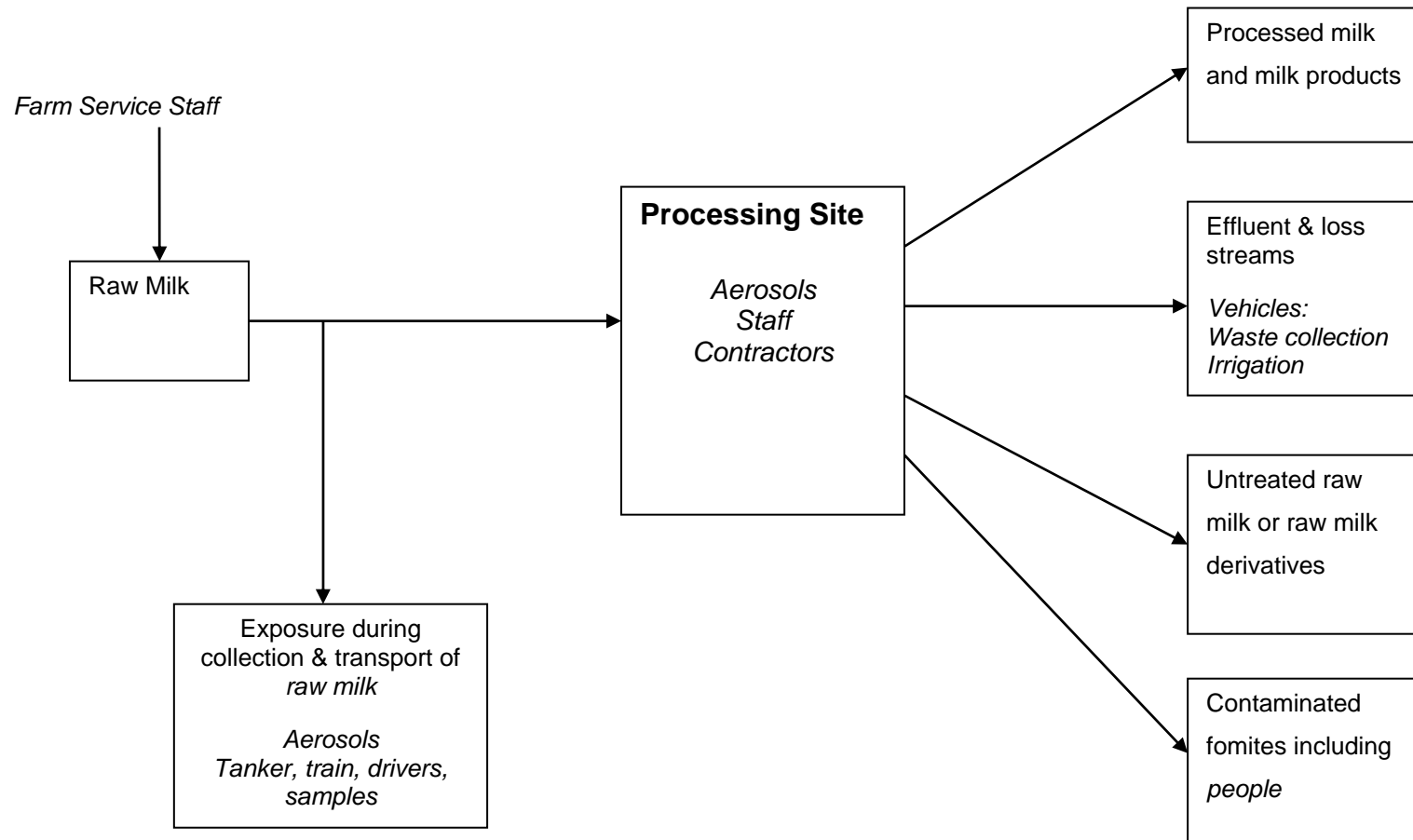
A biological pathway overview has been established (Figure 1), which is expanded to two more detailed exposure pathways (Figures 2 and 3), one examining pathways for infected raw milk during collection, and the other infected milk on a processing site. These demonstrate the potential routes by which susceptible animals could become infected as a result of normal dairy industry activities.

The end result is a table which shows 15 pathways that could result in exposure of susceptible animals to infection (Table 1). The pathways are generic for any disease situation that may be encountered. The detail of which risk mitigation measures (e.g. disinfection techniques) are appropriate and the level of risk associated with each pathway will depend upon the organism.

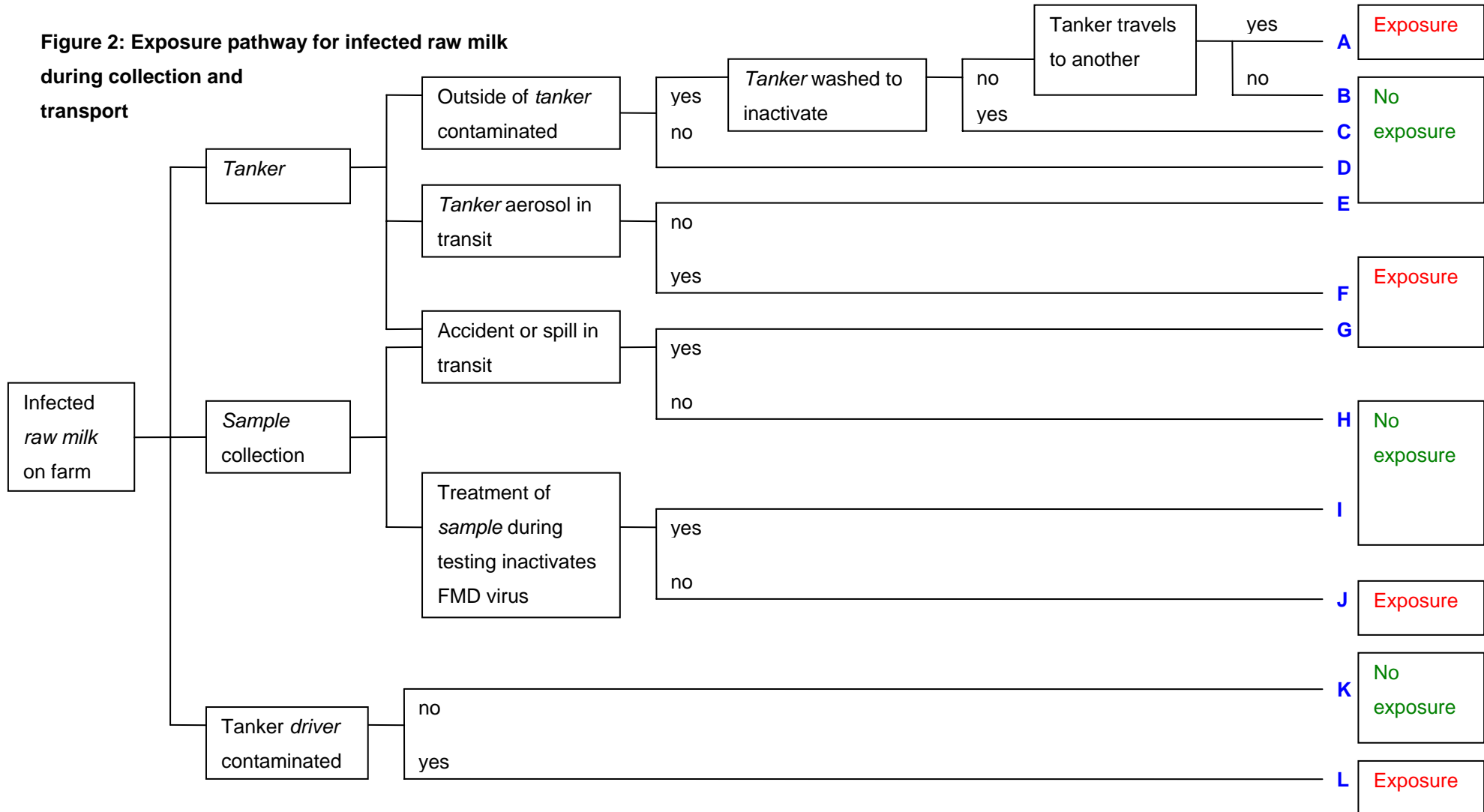
Each pathway also gives an overall level of perceived risk. This is based on the amount of infectious FMD virus likely to be present, and the likelihood of exposure of susceptible animals.

Two significant and five remote risk pathways have been identified. **When considering the development of a site response plan, the level of risk for a pathway should be used to determine the priority of the actions required.**

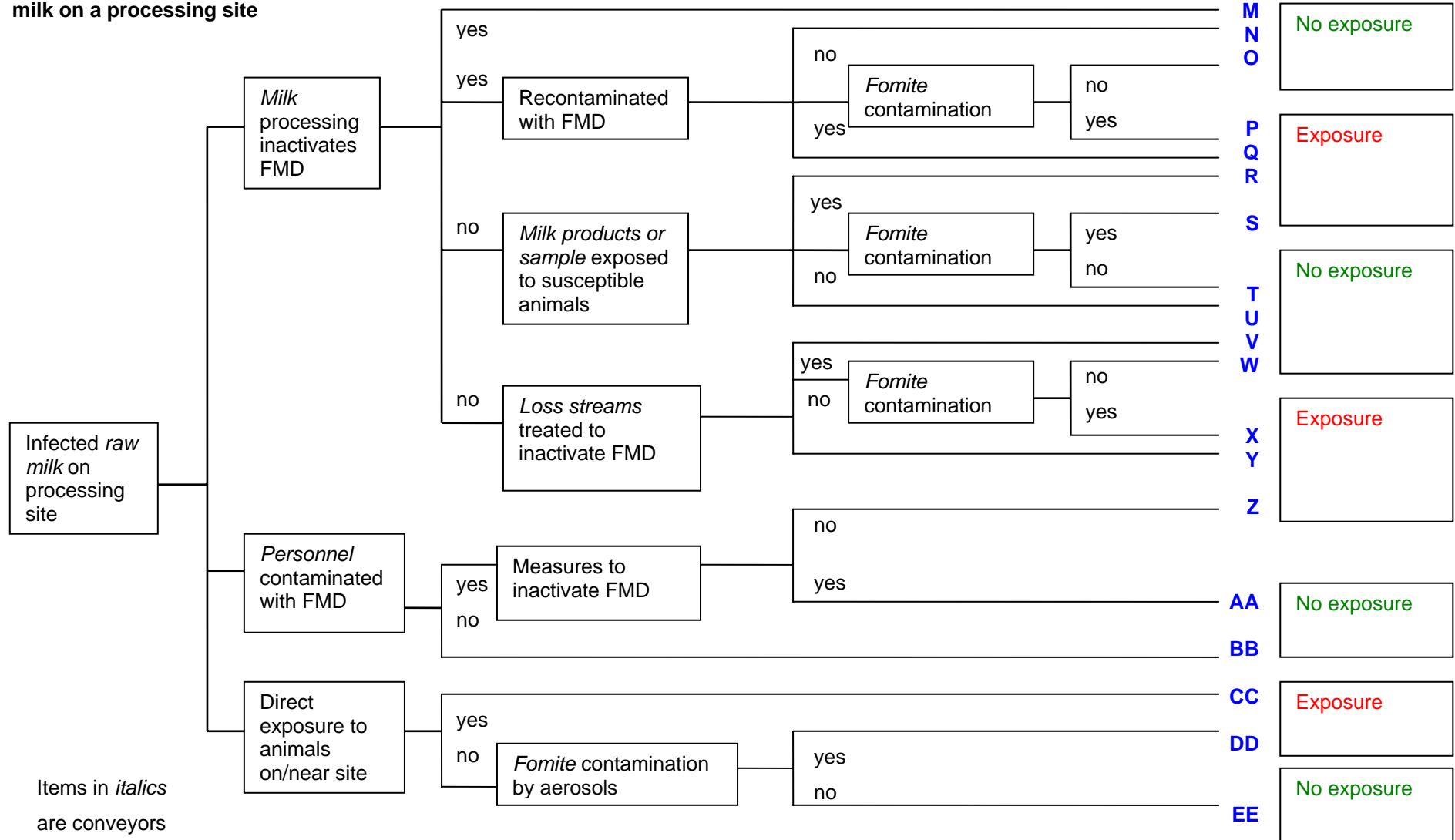
**Figure 1. Biological Pathway for milk – dairy processing industry**



**Figure 2: Exposure pathway for infected raw milk during collection and transport**



**Figure 3: Exposure pathways for infected milk on a processing site**





**Table 1. Evaluation of Exposure Pathways and level of risk for the spread of FMD virus**

Exposure Pathway	Probability of exposure	Probability of infectious dose of virus in conveyor	Likelihood of infectious episode*	Comments <sup>+</sup>
A Outside of tanker contaminated	Remote	Significant	Remote	
F Tanker aerosol	Remote	Remote	Remote	
G Accidental spill	Remote	Remote	Remote	Exposure of animals to milk and contaminated vehicle (faeces etc).
J Sample disposal	Significant	Significant	Significant	Untreated samples fed to animals.
L Contaminated tanker driver	Negligible	Remote	Negligible	
P Fomite contamination with recontaminated product	Negligible	Negligible	Negligible	
Q Recontamination of non-infectious product	Remote	Negligible	Negligible	
R Exposure of susceptible animals to infectious product from processing site	Remote	Remote	Remote	
S Fomite contamination with infectious product	Remote	Negligible	Negligible	
X Fomite contamination with infectious loss stream product	Negligible	Negligible	Negligible	
Y Susceptible animal contact with infectious loss streams	Significant	Significant	Significant	Separator sludge collected pre-pasteurisation for feeding to animals, retail cream fed to animals.

Z Contaminated personnel in contact with susceptible animals	Remote	Negligible	Negligible	
CC Direct exposure to animals on or near a processing site	Remote	Remote	Remote	
DD Fomites contaminated by aerosols generated at a processing site	Negligible	Negligible	Negligible	

\* Combined risk of Probability of exposure and Probability of infectious dose in conveyor.

### Exposure Pathways – Milk Collection & Transport

Exposure pathways during milk collection and transport and suggested options for mitigating risk associated with these pathways are given in table 2.

Note: The mitigation options are suggestions only – each site is encouraged to determine which risk pathways could potentially result exposure for their specific operation and the appropriate risk mitigation measures.

**Table 2: Exposure pathways and suggested mitigation options for milk collection and transport**

Exposure Pathway	Risk (FMD)	Suggested mitigation options
Sample disposal	Significant	<ul style="list-style-type: none"> <li>Do not collect samples</li> <li>Dispose of samples so susceptible animals are not exposed</li> <li>Treat samples to ensure safe for animal consumption</li> </ul>
Outside of tanker contaminated	Remote	<ul style="list-style-type: none"> <li>Animals off tanker tracks</li> <li>If animals use tanker tracks clean and disinfect area immediately afterwards</li> <li>Drivers to carry equipment to clean tanker if contaminated</li> <li>Animals held away from tanker track and shed during milk collection</li> </ul>
Tanker aerosol	Remote	<ul style="list-style-type: none"> <li>Animals held away from tanker track and shed during milk collection</li> <li>Filters (efficacy would need to be proven)</li> </ul>
Accidental spill	Remote	<ul style="list-style-type: none"> <li>In event of a spill:               <ul style="list-style-type: none"> <li>Notify SRO</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>• Identify animals that have had access to milk</li> <li>• Prevent access of animals to milk</li> <li>• Disinfect and/or dispose of spilt milk as directed by SRO</li> <li>• Drivers to carry disinfectant in case of spill</li> </ul>
Contaminated tanker driver	Negligible	<ul style="list-style-type: none"> <li>• Drivers to carry disinfectant and equipment to clean boots and hands of obvious contamination with milk, faeces etc</li> <li>• Drivers to wear clean outer clothing             <ul style="list-style-type: none"> <li>• Change outer clothing if it becomes contaminated</li> <li>• Change outer clothing at end of shift before going home, wash hands or shower if heavily contaminated</li> </ul> </li> <li>• Outer clothing to be laundered according to instruction from SRO</li> <li>• Drivers to have no contact with animals during milk collection</li> </ul>

### Exposure Pathways – Milk Processing

Exposure pathways during milk processing and suggested options for mitigating risk associated with these pathways are given in table 3.

Note: The mitigation options are suggestions only – each site is encouraged to determine which risk pathways could potentially result exposure for their specific operation and the appropriate risk mitigation measures.

**Table 3: Exposure pathways and suggested mitigation options for milk processing**

Exposure Pathway	Risk (FMD)	Suggested mitigation options
Susceptible animal contact with infectious waste and loss streams	Significant	<ul style="list-style-type: none"> <li>• Alternative disposal pathways for raw milk products and waste containing raw milk other than feeding to animals</li> <li>• Treatment of waste to ensure safe for animal consumption</li> </ul>
Exposure of susceptible animals to infectious product from a processing site	Remote	<ul style="list-style-type: none"> <li>• Hold animals at maximum distance from the site, regular surveillance</li> <li>• Prevention of run-off of milk spills etc to animal environments</li> <li>• Vermin and animal control to prevent mechanical transmission of infectious material</li> </ul>
Direct exposure to animals on or near a processing site	Remote	<ul style="list-style-type: none"> <li>• Hold animals at maximum distance from the site, regular surveillance</li> <li>• Filters or other mitigation e.g. enclosed space where aerosols of raw milk are possible</li> </ul>
Fomite contamination with recontaminated product	Negligible	<ul style="list-style-type: none"> <li>• Prevent free movement from raw milk to processed product areas</li> <li>• Fomites remain on site or cleaned and disinfected before removal</li> <li>• Cleaning and disinfection of potentially infected areas</li> </ul>
Recontamination of non-infectious product	Negligible	<ul style="list-style-type: none"> <li>• Prevent free movement from raw milk to processed product areas</li> <li>• Ensure product destined for stock food cannot be contaminated by raw milk or other infectious material e.g. staff or farmer clothing and footwear</li> <li>• Cleaning and disinfection of potentially infected areas</li> </ul>
Fomite contamination with infectious product	Negligible	<ul style="list-style-type: none"> <li>• Fomites remain on site or cleaned and disinfected before removal</li> </ul>
Fomite contamination with infectious waste & loss streams	Negligible	<ul style="list-style-type: none"> <li>• Fomites remain on site or cleaned and disinfected before removal</li> </ul>
Contaminated people in contact with susceptible animals	Negligible	<ul style="list-style-type: none"> <li>• People in contact with raw milk to wear clean outer clothing               <ul style="list-style-type: none"> <li>• Change outer clothing if it becomes contaminated</li> </ul> </li> <li>• Change outer clothing at end of shift before going home, wash hands or shower if heavily contaminated</li> </ul>

		<ul style="list-style-type: none"> <li>• Outer clothing to be laundered according to instruction from SRO</li> <li>• Minimise contact with susceptible animals</li> </ul>
Fomites contaminated by aerosols generated at a processing site	Negligible	<ul style="list-style-type: none"> <li>• Filters or other mitigation e.g. enclosed space where aerosols of raw milk are possible</li> <li>• Fomites remain on site or cleaned and disinfected before removal</li> </ul>

## 5 Risk Profile References

Belton, D.J. 2004, 'The macro-economic impact of a foot-and-mouth disease incursion in New Zealand', *Developments in Biologicals*, vol. 119, pp. 457-61.

Dawson, P.S. 1970, 'The involvement of milk in the spread of foot-and-mouth disease: an epidemiological study', *The Veterinary Record*, vol. 87, pp. 543-548.

Donaldson, A.I. 1997, 'Risks of spreading foot and mouth disease through milk and dairy products', *Rev. sci. tech. Off. int. Epiz.*, vol 16, no. 1, pp. 117-124.

Donaldson, A.I., Gloster, J., Harvey, L.D.J. & Deans, D.H. 1982, 'Use of prediction models to forecast and analyse airborne spread during the foot-and-mouth disease incursions in Brittany, Jersey and the Isle of Wight in 1981', *The Veterinary Record*, vol. 110, pp. 53-57

Gibbens, J.C., Sharpe, C.E., Wilesmith, J.W., Mansley, L.M., Michalopoulou, E., Ryan, J.B.M. & Hudson, M. 2001, 'Descriptive epidemiology of the 2001 foot-and-mouth disease epidemic in Great Britain: the first five months', *The Veterinary Record*, vol 149, pp. 729-743.

Thompson, D., Muriel, P., Russell, D., Osborne, P., Bromley, A., Rowland, M., Creigh-Tyte, S. & Brown, C. 2002, 'Economic costs of the foot-and-mouth disease incursion in the United Kingdom in 2001', *Rev. sci. tech. Off. int. Epiz. (Scientific and Technical Review)*, vol. 21, no. 3, pp. 675-687.

Tinline, 1972 (cited by Sanson).

Westergaard, J.M. 1982, Report on the eradication of foot-and-mouth disease on the islands of Funen and Zealand, Denmark 1982, Danish Veterinary Service, Copenhagen.