



FARMED ANIMAL MASS CARCASS DISPOSAL PLAN
FOR
THE CITY OF CHILLIWACK

Version 1.1 (Interim)
December 2006

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FOR
THE CITY OF CHILLIWACK



**This plan was developed under the provisions of the
Farmed Animal Mass Carcass Disposal Project – Phase 1**

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OVERVIEW

RESPONSIBILITIES FOR CARCASS DISPOSAL

LOCAL LIVESTOCK INDUSTRIES

Local livestock industries are the *first line responders* in a carcass disposal emergency. Producers are required to manage routine animal mortality and should have emergency plans for mass carcass disposal.

When mass carcass disposal is related to a foreign animal disease emergency, or is beyond industry's capability to manage, producers cooperate with all levels of government to ensure an effective response.

LOCAL GOVERNMENTS

Local governments should have emergency plans for carcass disposal and will manage carcass disposal emergencies caused by natural disasters or by non-reportable animal diseases.

When a carcass disposal emergency involves a foreign animal disease, or is too large to be managed locally, the local government participates in an expanded response in conjunction with other levels of government.

GOVERNMENT OF BRITISH COLUMBIA

The Provincial Emergency Program (PEP), in conjunction with the Ministry of Agriculture and Lands and the Ministry of Environment, will provide support to local governments for planning and responding to carcass disposal emergencies. When a local government EOC opens in response to a carcass disposal emergency, PEP will activate and provide support appropriate to the situation.

When a carcass disposal emergency is the result of a foreign animal disease, the provincial government will participate in a joint federal-provincial response in accordance with the *Foreign Animal Disease Emergency Support Plan*.

GOVERNMENT OF CANADA

Foreign animal diseases fall into the federal arena of legislated authority and responsibility. When a carcass disposal emergency is the result of a foreign animal disease the federal government, through the Canadian Food Inspection Agency, will initiate and lead a joint federal-provincial response, in accordance with the *Foreign Animal Disease Emergency Support Plan*.

COLLECTIVE RESPONSIBILITY

The complex nature of carcass disposal operations require that all levels of government and local livestock industries work together to resolve the situation quickly and efficiently, with minimum risk to human health and the environment.

Glossary

Composting

Carcass composting is a natural biological decomposition process that takes place in the presence of oxygen (air).

Control Area

A geographical area that is legally defined in a Ministerial declaration and which is subject to specified activities to contain and/or eradicate a Foreign Animal Disease outbreak.

Disaster

A calamity caused by accident, intent, fire, explosion or technical failure, or by the forces of nature, which results in serious harm to the health, safety or welfare of people, the environment, or in widespread damage to property.

Emergency

A present or imminent event caused by accident, intention, fire, explosion or technical failure, or by the forces of nature which requires prompt coordination of action or special regulation of persons or property to protect the health, safety or welfare of people or to limit damage to property.

Farmed Animals

For the purposes of this plan, farmed animals include alpacas, cattle, donkeys, fur farmed animals, goats, horses, llamas, mules, poultry, rabbits, sheep and swine.

Fomites

Inanimate objects (e.g., boots, clothing, equipment, vehicles, crates, packaging) that can carry an exotic agent and spread a disease through mechanical transmission.

Foreign Animal Disease

All federally-reportable foreign animal diseases listed by the Office International des Epizooties as transmissible diseases that have the potential for very serious socio-economic or public health consequences, and are of major importance in the international trade of animals and animal products. (A list of Foreign Animal Diseases is at Annex A).

Foreign Animal Disease Emergency Support Plan

A plan which provides an agreement whereby federal and provincial agencies accept responsibilities for a collaborative response to a foreign animal disease event in BC.

Hazard

A source of potential harm, or a situation with a potential for causing harm in terms of human injury, damage to health, property, the environment or some combination of these.

Infected Premises

A private or public building and appurtenant buildings and land area in which a Foreign Animal Disease agent has been found or is suspected.

Infected Zone

A geographic area that contains infected premises. Depending on the disease, the perimeter of the infected zone shall extend a minimum of three kilometers beyond all known infected premises and shall follow, when possible, natural barriers and roadways to facilitate implementation of disease control procedures.

Livestock

The term *livestock* in BC includes alpacas, aquaculture animals, cattle, donkeys, fur farmed animals, game farmed animals, goats, horses, llamas, mules, musk oxen, poultry, rabbits, sheep, swine and other exotic animals as prescribed by the Minister of Agriculture and Lands.

Local Authority

Defined by the BC Emergency Program Act to include:

- for a municipality, the municipal council; and
- for an electoral area in a regional district, the board of the regional district.

Movement Control

The primary process of reducing the spread of a foreign animal disease, as most diseases spread by contact with infected or contaminated animals, animal product, by-products, feeds and items used to feed and care for animals. The movement of all pertinent animals or things within the prescribed area may be tracked, monitored and controlled through a permit system.

Office International des Epizooties (OIE)

The OIE is an intergovernmental organization created by international agreement. The 28 member countries undertake to report the animal diseases detected on their territory. The OIE then disseminates the information to other countries, which can take the necessary preventive action.

Pathogen

Any organism capable of producing disease or infection. Often found in waste material, most pathogens are killed by high temperatures.

Rendering

The breaking down of animal tissues into constituent fat and protein elements by the application of heat, pressure or other means.

Reportable Disease

These diseases are outlined in the federal *Health of Animals Act and Regulations* and are usually of significant importance to human or animal health or to the Canadian economy. Animal owners, veterinarians and laboratories are required to immediately report the presence of an animal that is contaminated or suspected of being contaminated with one of these diseases to a CFIA district veterinarian. Control or eradication measures will be applied immediately. (A list of Reportable Diseases is at Annex A).

Specified Risk Material

The skull, brain, trigeminal ganglia (nerves attached to the brain, eyes, tonsils, spinal cord) and dorsal root ganglia (nerves attached to the spinal cord) of cattle aged 30 months or older, and the distal ileum (portion of the small intestine) of cattle of all ages. Plus all material from dead stock and condemned cattle containing SRM.

Surveillance Zone

A geographic area that extends from the perimeter of an infected zone to a minimum of ten kilometers from any infected premise or to the outer perimeter of a control area.

Vector

An animal that has the potential to transmit a disease, directly or indirectly, from one animal or its excreta to another animal.

Zoonosis

Any disease that can be transmitted to humans from animals.

Acronyms / Abbreviations

| | |
|---------------|---|
| AAR | After Action Report |
| ALR | Agricultural Land Reserve |
| BCAS | British Columbia Ambulance Service |
| BCERMS | British Columbia Emergency Response Management System |
| CCG | Central Coordination Group |
| CFIA | Canadian Food Inspection Agency |
| EOC | Emergency Operations Centre |
| FAD | Foreign Animal Disease |
| FADES | Foreign Animal Disease Emergency Support |
| FVRD | Fraser Valley Regional District |
| INAC | Indian and Northern Affairs Canada |
| JEOC | Joint Emergency Operations Centre |
| MAL | Ministry of Agriculture and Lands |
| MOE | Ministry of Environment |
| MOH | Ministry of Health |
| MOT | Ministry of Transportation |
| PAB | Public Affairs Bureau |
| PEP | Provincial Emergency Program |
| PREOC | Provincial Regional Emergency Operations Centre |
| SRM | Specified Risk Material |

1. Introductory Material

1.1 Purpose and Scope

The primary purpose of this plan is to guide the City of Chilliwack's response for dealing with mass animal carcasses generated in an emergency. The plan is designed to enhance the city's capacity to recover quickly from a mass animal carcass emergency and reduce the impact on the local agriculture industry.

A corollary purpose of the plan is to provide a source of local information related to a carcass disposal emergency which may be used by federal, provincial and local agencies which participate in an expanded response to a carcass disposal emergency. This information will include a profile of animal farming sites and activities in the City of Chilliwack, and a list of city resources and capabilities which may be utilized in an emergency response.

The scope of this plan includes:

- a) a description of the agriculture in the area with emphasis on local farmed animal populations;
- b) identification of hazards and vulnerabilities that could result in a mass carcass disposal emergency situation in the city area;
- c) a concept of operations for disposal operations;
- d) approved methodologies for mass carcass disposal;
- e) identification of disposal resources and key personnel required to respond to an emergency situation;
- f) activities that must be performed in the event of a mass carcass disposal emergency;
- g) identification of resources required and available;
- h) identification of resource shortfalls; and
- i) a framework for post-emergency recovery.

1.2 Responsibility for the Plan

The Emergency Coordinator is responsible for the upkeep of this plan. The plan will normally be updated annually in December.

1.3 Authorities

Disposal of animal carcasses is governed by a number of federal and provincial regulations. Principal among these are:

Federal

- a) [Emergency Preparedness Act](#)
- b) [Emergencies Act](#)
- c) [Health of Animals Act](#)
- d) [Health of Animals Regulations](#)

Provincial

- a) [Emergency Program Act](#)
- b) [Emergency Management Regulation](#)
- c) [Local Authority Emergency Management Regulation](#)
- d) [Animal Disease Control Act](#)
- e) [Animal Disease Control Regulation](#)
- f) [Agricultural Waste Control Regulation](#)
- g) [Environmental Management Act](#)
- h) [Health Act](#)

Foreign animal diseases fall into the federal arena of legislated authority and responsibility. The Government of Canada considers such diseases a threat to national security and, through the Canadian Food Inspection Agency (CFIA), leads response efforts to control the disease. However, it is recognized that no single federal agency can manage the risks from foreign animal disease, and response plans require all levels of government to work together along with local livestock industries.

1.4 Requirement for the Plan

Section 2(1) of the *BC Local Authority Emergency Management Regulation –1995* requires local authorities to prepare emergency plans that reflect the local authority's assessment of the relative risk of occurrence and the potential impact on people and property of the emergencies or disasters that could affect all or any part of the jurisdictional area for which the local authority has responsibility.

The desirability of having a carcass disposal plan at the local government level is set out in the *Ministry of Agriculture and Lands Emergency Response Plan 2006*, which states in part:

“BC local authorities should have emergency plans to deal with livestock mortalities from livestock disease outbreaks, as well as to address dead stock arising from natural disasters such as floods, fires and earthquakes.

“Local plans should allow for timely and efficient disposal of dead stock so as to minimize impacts on human, environmental and livestock health. Local authorities should take into account animal-related threats to human health and the environment; identify resources and key personnel to deal with the threats; identify methods of utilizing resources; and outline activities that must be performed in the event of an emergency”.

1.5 Related Plans

This emergency plan is related to other plans, the most important of which are:

- a) FADES – Foreign Animal Disease Emergency Support Plan (2006 Interim Plan);

- b) Emergency Response Plan for BC Ministry of Agriculture and Lands (2006);
- c) Emergency Response/Recovery Plan for the City of Chilliwack (rev. January 2006); and
- d) City of Chilliwack Public Works Emergency Plan (rev. 2006).

There are some industry emergency plans which apply to specific situations. For example, the Dairy Farmers of Canada has a national crisis communications plan which is used by the BC Milk Producers Association.

1.6 Chilliwack Emergency Organization

The *Emergency Planning and Operations Committee* will be the key source of oversight and decision-making with respect to a mass carcass disposal emergency.

The city has three EOC activation levels based on the severity of the emergency. Depending on the level of activation, one of two designated EOCs may be opened:

Primary Emergency Operations Centre:

Chilliwack Fire Department: No. 4 Fire Hall located on South Sumas (West Entrance).

Alternate Emergency Operations Centre:

City of Chilliwack, Public Works Office (Upper Level).

In a mass carcass disposal emergency the city may be required to work directly with the livestock industry in mounting a local response, or may form part of an expanded response involving other levels of government. The *Concept of Operations* for a mass carcass disposal emergency is set out in Section 3.

1.7 Identification of Key Personnel

Key personnel in handling a carcass disposal emergency will include:

| | |
|--------------------------------|-----------------------|
| Chief Administrative Officer | EOC Director |
| Fire Chief | Emergency Coordinator |
| Director of Engineering | Operations |
| Manager Environmental Services | Disposal Operations |
| Director of City Planning | Support |
| Director of Corporate Services | Public Information |
| Safety Coordinator | Safety Officer |

**1.8 Plan
Activation**

The requirement to activate this plan will normally be determined jointly by the Emergency Coordinator and Environmental Services Manager. A recommendation for activation will be passed to the *Emergency Planning and Operations Committee* for decision.

ON ACTIVATION OF THIS PLAN CONTACT:

Provincial Emergency Program: 1-800-663-3456 [24 hours]
and

Ministry of Agriculture and Lands: (604) 556-3001 [Business hours]

2. Local Area Data

2.1 Local Agricultural Profile

The City of Chilliwack is the second largest municipality in the FVRD. It is located primarily on flat valley-bottom land with very fertile soil. The area to the south is the least intensively developed for agriculture.

Sixty percent of land in the City of Chilliwack lies within the ALR, of which approximately 90% is currently used for farming. Animal farming includes dairy (12%), intensive livestock (8%)¹, horse farms/stables (7%), beef cattle farms (4%), specialty livestock (2%) and sheep/goat farms (1%). Livestock operations account for approximately 30% of all land use.

The approximate numbers of livestock farms in the city area are shown below by type:

| | |
|-------------------|-------|
| Dairy: | 427 |
| Beef Cattle: | 74 |
| Poultry and Eggs: | 217 |
| Horses: | 174 |
| Sheep: | 69 |
| Swine: | 57 |
| Rabbits: | 24 |
| Llamas & Alpacas: | 7 |
| TOTAL | 1,049 |

Dairy farms with their accompanying forage and pasture operations represent the largest use of ALR land in Chilliwack. Almost half of the dairy operations are medium-scale dairies that are milking between 50 and 100 cows.

Intensive livestock operations, where animals are exclusively raised inside an animal housing structure, represent the next most common type. Poultry farming is by far the most common type of intensive livestock operation in the area (~90%).

Horse farms, including stables and riding facilities, are numerous in the city area and horses are also often kept in small numbers on hobby farms.

¹ Intensive livestock includes poultry (layers, broilers, broiler hatching egg and turkey), swine, duck, fur and rabbits. These are livestock which are confined to barns.

2.2 Local Farmed Animal Population

Approximate total numbers of farmed animals in the City of Chilliwack are:

| | |
|-------------------------|-----------|
| Poultry | 2,547,350 |
| Cattle (Dairy and Beef) | 37,500 |
| Swine | 22,400 |
| Sheep/Goat | 6,000 |
| Horses | 900 |
| Other ^{Note 1} | 1,510 |

Note 1: The *Other* category includes bison, rabbit, deer, llama/alpaca and game birds.

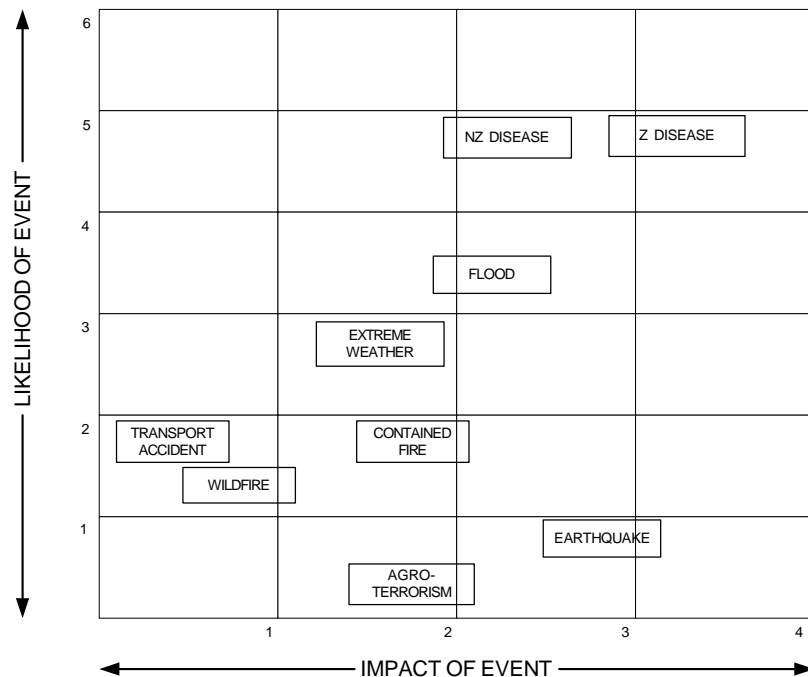
Calculation of volume and mass by species is at Appendix 1 to this section, and a map showing the distribution of animal farms and facilities is at Appendix 2 to this section.

2.3 Land Use Inventory

Additional data for the local area may be found in the *City of Chilliwack Agricultural Land Use Inventory 2004*, published by the Ministry of Agriculture and Lands. Copies will be available in the city EOC if it is activated for a mass animal mortality emergency.

2.4 Risk Profile

The risk profile for farmed animal mass mortality in Chilliwack is illustrated below (see Note 1):



Note 1: The grid illustrates the likelihood of specified hazards causing mass animal mortality and the relative impact of the event. (Z = Zoonotic, NZ = Non-Zoonotic). For further information on the grid see <http://www.pep.bc.ca/hrva/toolkit.html>.

2.5 History of Mass Animal Mortality in the Region

c. 1948 – Fraser Valley flooding. Loss of poultry in the hundreds but not a major emergency. Dairy farmers were able to drive cattle to host farms on higher ground.

Feb-May 2004 – major outbreak of high pathogenic avian influenza among poultry in the lower Fraser Valley, centered on Abbotsford. The CFIA depopulated all infected premises (42 commercial and 11 backyard premises) on which highly pathogenic AI was found and preemptively destroyed birds in the surrounding 3-km areas. Approximately 17 million birds killed, among which 3.5 million were infected with the virus.

Other instances of animal mortality caused by disease have occurred in the Chilliwack area, but not on a scale that would initiate a carcass disposal emergency.

2.6 Commodity and Advisory Groups

A list of Chilliwack area livestock producer associations and agriculture advisory groups is at Appendix 3 to this section.

Appendix 1 to Section 2 Calculation of Volume and Mass by Species – Chilliwack 2006

| Livestock | Number of Head [Note 1] | Average Mass (kg) [Notes 2, 4] | Total Mass (tonnes) [Note 3] | Volume Factor (cu metres) [Note 2] | Total Volume (cu metres) [Note 4] |
|---------------------|----------------------------|-----------------------------------|---------------------------------|---------------------------------------|--------------------------------------|
| Hens and Chickens | 2,430,000 | ≈1.25 | 3,038 | .015 | 36,450 |
| Turkeys | 400 | 5 | 2 | .0375 | 15 |
| Total Other Poultry | 116,945 | ≈2.5 | 292 | .019 | 2,222 |
| Total | 2,547,345 | | 3,332 | | 38,687 |

| | | | | | |
|----------------------|---------------|-----|---------------|-----|---------------|
| Cows (Dairy/Beef) | 19,580 | 635 | 12,433 | 1.5 | 29,370 |
| Heifers (Dairy/Beef) | 8,952 | 455 | 4,073 | 1.0 | 8,952 |
| Calves (Dairy/Beef) | 8,969 | 210 | 1,883 | 0.5 | 4,485 |
| Total | 37,501 | | 18,389 | | 42,807 |

| | | | | | |
|-----------------|---------------|-----|--------------|-------|--------------|
| Pigs – Boars | 156 | 210 | 33 | 0.375 | 59 |
| Pigs – Sows | 4,290 | 200 | 858 | 0.375 | 1,609 |
| Nursery | 6,000 | 15 | 90 | 0.12 | 720 |
| Grower/Finisher | 12,000 | 75 | 900 | 0.3 | 3,600 |
| Total | 22,446 | | 1,881 | | 5,988 |

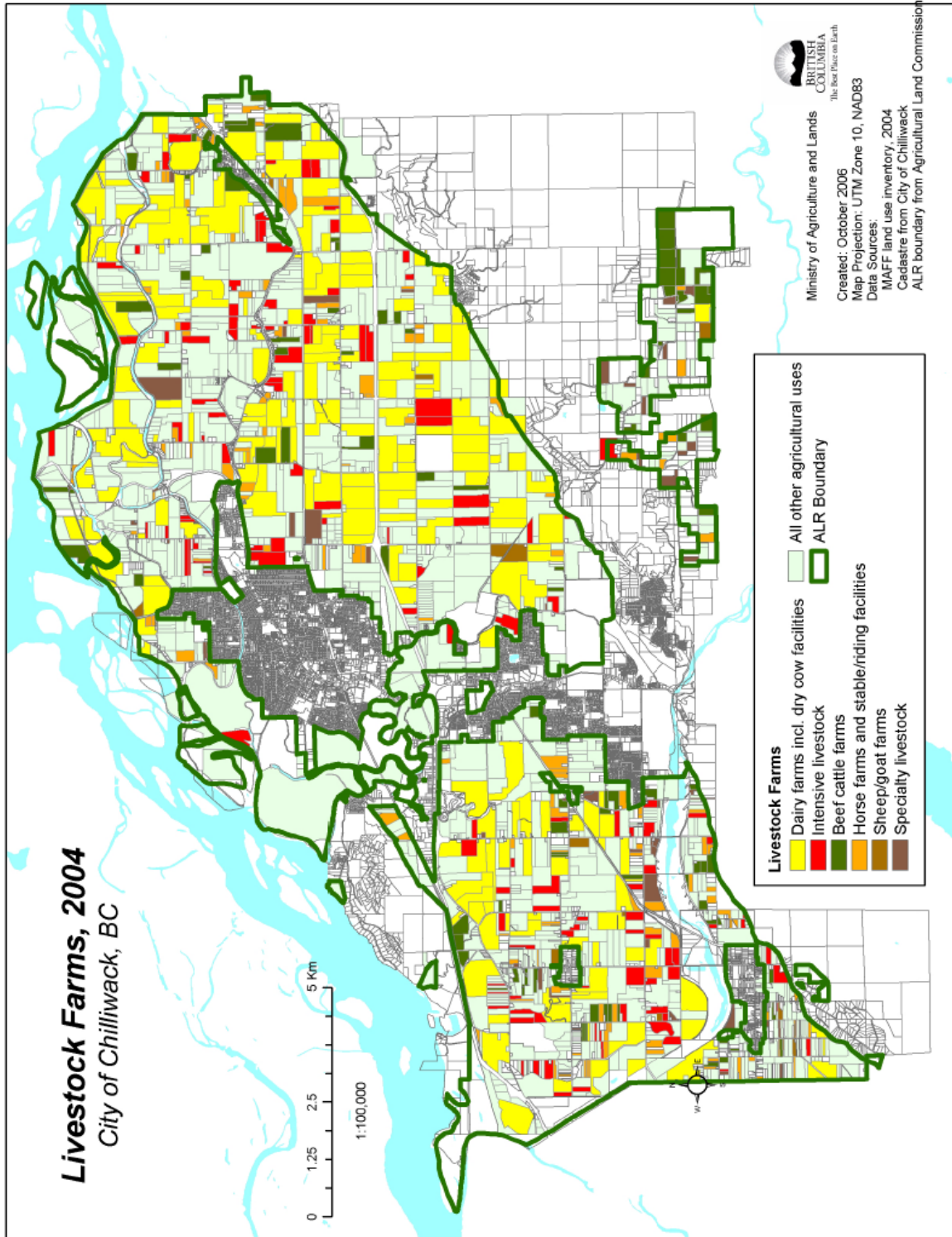
| | | | | | |
|---------------------|--------------|----|------------|------|------------|
| Sheep – Rams / Ewes | 880 | 80 | 70 | 0.3 | 264 |
| Lambs | 954 | 40 | 38 | 0.15 | 143 |
| Total | 1,834 | | 108 | | 407 |

| | | | | | |
|--------|-------|-----|-----|-----|-------|
| Horses | 880 | 523 | 460 | 1.5 | 1,320 |
| Bison | 100 | 455 | 46 | 1.5 | 150 |
| Goats | 4,144 | 70 | 290 | 0.3 | 1,243 |

Notes:

- Number of head is derived from Statistics Canada 2001 Census data and Chilliwack *Waste to Resources Strategy, 2006 (Draft)*.
- The average mass and volume factors for each livestock category are per CFIA publication, *Mass Slaughter and Disposal of Livestock, Rural Municipality of Hanover, Manitoba, Information Book, July 21, 2006 (Draft)*.
- The total mass calculation is based on the average livestock weight in kilograms multiplied by the number of head. This is converted to metric tonnes by multiplying the total weight in kilograms by the conversion factor 0.001.
- The total volume is the space required for burial based on the number of head multiplied by the volume factor. The volume factors were derived from the number of head that would equal one adult bovine unit, requiring 1.5 cubic metres of space for burial. To calculate pit dimensions, the following can be used for a rule-of-thumb: 1 bovine unit = 5 adult sheep = 4-5 mature swine = 100 mature chickens = 40 mature turkeys.

Appendix 2 to Section 2 Map: Livestock Farms – City of Chilliwack



Appendix 3 to Section 2 Commodity and Advisory Groups

Abbotsford Chamber of Commerce Agriculture
Committee
2462 McCallum Rd
Abbotsford, BC V2S 3T9
(604) 859-9651

BC Goat Breeders Association
26215-84th Ave
Langley, BC V1M 3M6
(604) 856-6849

BC Milk Producers Association
3236 Beta Avenue
Burnaby, BC V5G 4K4
(604) 294-3737

BC Goat Milk Producers Association
3421 Boundary Road
Abbotsford, BC
V3G 2N1

BC Broiler Hatching Egg Producers Association
464 Riverside Rd.
Abbotsford, BC V2S 7M1
(604) 850-1854

BC Sheep Federation
Box 1302,
Lillooet, BC V0K 1V0
(250) 455-6651

BC Egg Producers Association with affiliate,
Fraser Valley Egg Producers
Central Agricultural Facility
PO Box 310, 2669 Deacon Street
Abbotsford, BC V2S 4P2
(604) 556-3348

BC Specialty Birds Association
Ken Falk, President
32351 Huntingdon Road,
Abbotsford, BC V2T 5Y8
(604) 854-6776

BC Chicken Growers' Association
PO Box 581,
Abbotsford, BC V2S 6R7
(604) 859-9332

Fraser Valley Llama and Alpaca Club
18014 Fraser Highway
Surrey BC V3S 8E7
(604) 574-3769

BC Turkey Association
#106-19329 Enterprise Way
Surrey, BC V3S 6J8
(604) 534-5644

Fraser Valley Farm Direct Marketing
Association
Box 327, #800-15355 24th Ave
White Rock, BC V4A 2H9

BC Pork Producers
2010 Abbotsford Way
Abbotsford, BC V2S 6X8
(604) 853-9461

Horse Council of BC
2669 Deacon St.
Abbotsford, BC V2T 6H3
(604) 856-4304

3. Concept of Operations

3.1 General

Mortality losses are a normal part of livestock production. Producers may have losses due to disease, natural events such as extreme weather, fires, accidents or inter-animal competition. It is the responsibility of the producer to dispose of these routine mortalities in an acceptable manner. Industry and primary producers are responsible for developing their own plans for carcass disposal.

In intensive livestock operations such as poultry farming, the routine disposal of large numbers of carcasses following incidents of, for example, severe hot weather, may be considered normal. Mass carcass disposal will only become an emergency if the scale and extent of farmed animal mortality is beyond the capability of local producers, results from a reportable or foreign animal disease or if there is otherwise a significant risk to public health.

The primary objectives of disposal of carcasses is to prevent the dissemination of infection and to protect the environment. This process is therefore an essential part of an animal disease eradication program and is also important from both a public health and environmental perspective.

Potential causes of mass farmed animal mortality range from natural disasters to more complex situations involving infectious diseases. Notwithstanding the cause, timely and effective local response is essential in order to limit impact on the industry and community, and to allow for the mobilization of resources from other levels of government if required.

The efficient and environmentally safe disposal of mass animal carcasses will require:

- a) early notification;
- b) the selection of an appropriate disposal methodology;
- c) the availability of suitable disposal sites; and
- d) the timely provision of applicable resources.

3.2 Operational Context

Emergency planning for mass livestock carcass management anticipates a cooperative partnership between local livestock producers, local authorities, the province and CFIA. While producers will take the lead role in any livestock emergency, local authorities are expected to manage a consultative framework that allows for a timely and efficient approach to the emergency.

There are few circumstances in which a carcass disposal emergency will exist independently of a larger emergency or disaster situation. The circumstances which caused the animal mortality, e.g., a natural disaster such as a flood or a foreign animal disease, will frequently in itself trigger an emergency response. Carcass disposal will therefore normally be a component of a larger emergency situation and will fit in to the existing response and recovery structure.

There are two categories of response applicable to a mass animal mortality emergency:

| Non-FAD Response |
|--|
| <p>When a carcass disposal emergency is caused by mass animal mortality from natural disasters or animal diseases other than FAD, carcass disposal operations will, to the extent possible, be managed by the local government in cooperation with the livestock industry.</p> <p>In all such cases PEP will activate and provide an appropriate level of direction and assistance under the provincial integrated response structure.</p> |

| FAD Response |
|--|
| <p>In mass mortality events involving a foreign animal disease (FAD), the carcass disposal operation will be managed within an expanded response structure involving other levels of government in accordance with the FADES Plan. ^{Note 1}</p> <p>In such cases a <i>Joint Emergency Operations Centre (JEOC)</i> will normally be established in the operational area. Local government emergency resources must be effectively integrated with this expanded federal-provincial structure.</p> |

Note 1. A FAD response may also be conducted for a federal *Reportable Disease* of significant importance to human or animal health or to the Canadian economy. The determination of the level of response will be made by CFIA.

During a FAD response, the city's emergency structure will work in conjunction with the federal/ provincial JEOC in the affected area. City officials will play a key role in advising on local conditions, coordinating with the local livestock industry, providing information on disposal sites and resources, providing resources to the disposal effort and keeping the public advised.

3.3 Probable Roles and Tasks

The structure of a JEOC which may be established during a FAD Response is illustrated at Appendix 1 to this section.

Roles and tasks for local government in a carcass disposal emergency may include, either directly or in support of a federal/provincial emergency management structure, the following:

- a) *Assessment of Requirements*
Determine the scope and scale of emergency in local area. Review disposal protocols, adapt to the situation at hand and obtain the appropriate approvals.
- b) *Identification of Disposal Methods* ^{Note 1}
Review disposal options and identify the most acceptable alternatives. Promote/implement site-specific environmental mitigation and determine equipment and supplies required.
- c) *Disposal Site Selection*
Identify sites within the local area suitable for carcass disposal.
- d) *Transport of Carcasses*
Identify the primary and alternate means of transporting carcasses to disposal sites, and arrange suitable transportation resources.
- e) *Coordinating Support*
Determine requirements for equipment and other support resources, and assist in coordination throughout the emergency.
- f) *Monitoring*
Visit off-farm disposal facilities to ensure compliance with plans.
- g) *Documentation*
Gather and record information on carcass management.
- h) *Communications*
The timely passage of information among participating entities is of key importance during a carcass disposal emergency. A sustained effort is required to ensure that current information is passed to all stakeholders, including local industry representatives, neighbouring jurisdictions, health sector organizations and all other organizations engaged in, or associated with, the emergency response.

i) *Assisting Federal/Provincial Agencies*

Provide support to federal and provincial organizations as required, including PEP, MAL, MOE and CFIA.

[Note 1. Disposal protocols are currently under development. In the absence of protocols, advice should be sought from the MAL].

3.4 Adapting the Local Emergency Structure

The local response will be in accordance with the city's *Emergency Response/ Recovery Plan*, adapted for a carcass disposal emergency.

For a Non-FAD Response the existing city emergency structure will manage the response and coordinate carcass disposal operations in conjunction with the local livestock industry. PEP must be kept advised and will provide direction and/or assistance appropriate to the situation.

In a FAD Response, the FADES Plan will be activated. In this case, the City of Chilliwack emergency response structure will be integrated into the federal-provincial response structure, normally including a presence in the JEOC. The city may be required to undertake a variety of operational tasks within or as coordinated by the JEOC.

3.5 Natural Disasters

Natural disasters such as floods, fires or extreme weather can cause significant animal mortality, particularly in high density situations such as in intensive livestock operations. The natural events considered most likely to affect the City of Chilliwack are identified in Section 2.4, *Risk Profile*.

Response to mortality caused by natural disasters remains a local responsibility, and in some cases local livestock industry representatives will make all of the necessary arrangements. However, when the number of animal carcasses exceeds the disposal capacity of the producers, or when a significant public health impact is present, a carcass disposal emergency may result.

In such a situation the City of Chilliwack will be expected to provide the emergency framework, including resources, for carcass disposal operations.

As with other emergency situations, the city must remain in close contact with PEP, which will provide support appropriate to the situation. The MAL and Fraser Health Authority must be kept advised of all animal health/carcass disposal situations.

3.6 Animal Diseases

In accordance with the *Health of Animals Act* and *Animal Disease Control Act*, warning of animal mortality caused by an animal

disease will originate with producer(s), and carcasses must be inspected immediately by a local veterinarian. If mortality is determined to be the result of a non-reportable disease, the producers are initially responsible for carcass disposal.

If the scale of mortality from a non-reportable disease is beyond the capabilities of the livestock industry, the matter becomes an emergency and the City of Chilliwack will provide the response framework for emergency carcass disposal operations. In such an event, it is essential that the PEP, MAL, MOE and the Fraser Health Authority be consulted on all aspects of the city's response. Potential threats to public health and the environment must be closely and continually monitored.

If a FAD is suspected or present, an expanded federal-provincial response will be initiated. Initial notification may come from a producer, abattoir, diagnostic laboratory, local veterinary practitioner, public health unit or the BC Chief Veterinary Officer who, in turn, contacts the CFIA District Veterinarian or Regional Director.

CFIA evaluates the situation and determines what steps, if any, are necessary to further characterize the disease based on the epidemiology report from the initial visit to the suspect premises.

If the existence of a FAD is determined, a CFIA *Emergency Response Team* will be mobilized for further assessment of the situation and to commence control and eradication activities. The need for a JEOC will be assessed and, if required, will be established in the affected area.

Control and eradication activities will normally begin by controlling movements of animals and people in zones where the disease has been diagnosed. There may be one or more infected zones containing the infected premises. Depending upon the disease, the perimeter of the infected zone(s) would extend a finite distance beyond all known infected premises and would follow, when possible, natural barriers and roadways to facilitate implementation of disease control procedures.

Surrounding the infected zone(s), will be a security zone extending from the perimeter of the infected zone(s) to a specified distance, which could vary according to the disease. A buffer zone will extend from the outer limit of the security zone to the limit of the control area. The three zones will constitute a *control area* where certain measures would be applied according to a pre-approved disease control/eradication strategy.

In situations involving mass animal mortality, the JEOC will contain

| | |
|--|---|
| | <p>a <i>Disposal Group</i> to oversee carcass disposal operations. This group directs the disposal of carcasses and regulated materials associated with destruction ordered in the FAD response. The <i>Disposal Group</i> designs a disposal plan to prevent the spread of the pathogen and mitigate public health or environmental risks.</p> |
| <p>3.7 Destruction of Animals</p> | <p>The destruction of animals to support attempts to control the spread of disease is an integral part of a response to an animal health emergency involving a FAD. In such cases the JEOC will normally contain a <i>Destruction Group</i>.</p> <p>Given information about the disease, animal type, location of infected premises and disposal methods, the <i>Destruction Group</i> develops a strategy for destroying all animals that are known or suspected to be infected in an attempt to eradicate the disease. Pre-emptive destruction may extend, in some emergencies, to hobby farms and/or backyard poultry flocks.</p> <p>Animals destroyed in this way may not be infected with the underlying disease, but will still become part of the carcass disposal operation. Such carcasses may require separate transportation and disposal channels.</p> <p>Disposal should be completed as soon as possible after destruction to minimize opportunities for infectious material to disperse and to complete handling of carcasses before decomposition has set in.</p> <p>Officials must recognize the significant emotional impact on the owners of destroyed animals and deal with these situations with appropriate empathy. Representatives from the respective producer associations may be engaged to mitigate any conflicts which arise between the producers and the <i>Destruction Group</i>.</p> |
| <p>3.8 Impact on Human Health</p> | <p>The presence of a zoonotic disease, which has a potential impact on human health, will require close cooperation between animal health and human health officials in a carcass disposal emergency. Zoonotic diseases with a high risk of animal mortality are listed at Annex A.</p> <p>In the event of a FAD emergency the general public will be concerned with the implication of disease on their own health and that of their families. A key part of the emergency response will be ensuring that potential threats to human health are fully understood and managed effectively, which will necessitate a comprehensive public information strategy.</p> <p>In an animal disease/carcass disposal event the JEOC will normally include a <i>Human Health Branch</i>, which will be activated whenever</p> |

the identified FAD presents public risks associated with a zoonotic disease.

The Chilliwack EOC must maintain close communication with the Fraser Health Authority and local medical facilities throughout carcass disposal operations, and ensure that potential threats to human health, and mitigating strategies, are clearly understood and communicated.

FRASER HEALTH AUTHORITY:

1-877-935-5669 or (604) 587-4600 [General]

(604) 870-7900 [Environmental Health Services, Abbotsford]

(604) 587-3748 [Emergency Management]

[Business hours]

3.9 Safety

Personnel safety is an overriding consideration during disposal operations. Before commencing disposal work, personnel must be fully briefed on the nature of the disease, and any specific hygiene requirements.

Safety issues to consider include personal hygiene facilities, the availability of rescue equipment, hearing protection and protection from dust.

Protective clothing including respirators must be supplied to personnel when there is any risk to humans from the organism involved, or if large amounts of dust or odour are generated.

3.10 Environmental Issues

Disposal of animal carcasses and other infectious material may have adverse environmental consequences. It is essential for the environmental aspects of proposed disposal activities to be thoroughly evaluated so as to ensure that the impact of such consequences are minimized.

Proper environmental monitoring before and after carcass disposal is essential. Sampling frequency and volume should be determined based on a standard sampling method to prevent human-induced errors and to provide true characteristics and variability of the pollutant(s) from carcass disposal areas.

Consultation with the MOE during any carcass disposal operation is required to obtain specific information and ensure that current guidelines and best practices are being applied.

MINISTRY OF ENVIRONMENT

(604) 582-5200 [Environmental Protection, Surrey]

[Business hours]

3.11 First Nations

First responders are permitted to enter First Nations lands **only if specifically requested by the native bands and INAC.**

Should a carcass disposal emergency affect First Nations lands, prior authorization for entry must be obtained. This will normally be done through the JEOC or PEP, but in emergency situation may be done directly with INAC and the First Nations entity involved if this is practicable.

3.12 Media/Public Information

An effective public information strategy is an essential part of managing an emergency.

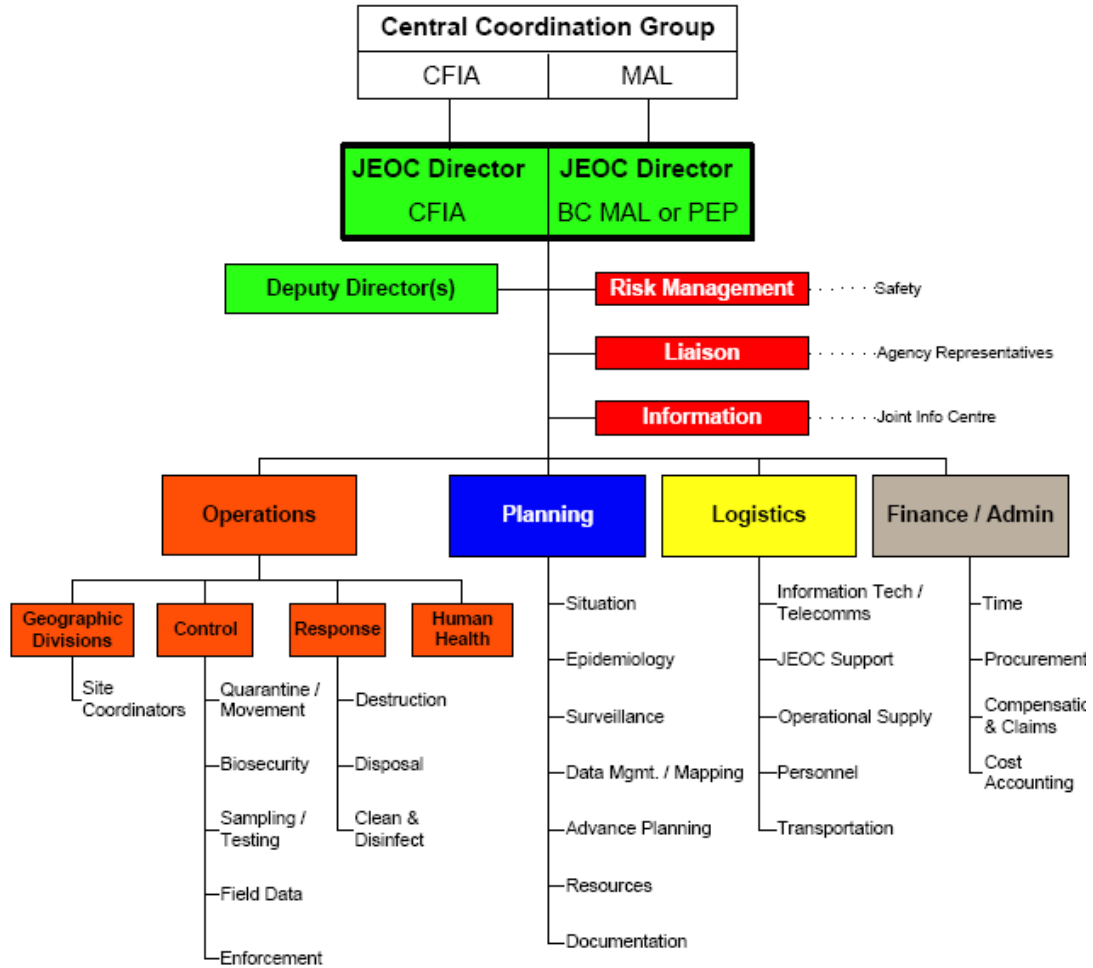
The public will demand information even if the effects of the emergency are limited, which will put an enormous premium on what city officials say publicly and how they say it. Negative public reaction can often be defused by an articulate, calm and confident spokesperson who is able to reassure the public that the response is appropriate and effective.

Experience has shown that a carcass disposal emergency is of significant public interest and that there will be a high demand for information throughout disposal operations. The effective fusion of information is particularly important, as there are likely to be several levels of responders involved. The key is to have designated public information officers and/or spokespersons from the outset, including industry representatives, who cooperate closely with each other. A clear, timely and consistent message is essential.

Despite the pressures and demands of dealing with the emergency, all organizations involved must ensure that the overarching requirement to deliver information is not unduly delayed by a perceived need to assemble complete information. The public wants to know the current situation, and should be briefed accordingly.

An information officer should be in the EOC at all times to collect and coordinate the information being received, and to ensure that the media and public are briefed regularly and comprehensively.

Appendix 1 to Section 3 FAD Response – JEOC Structure



The Chilliwack EOC will interact with and/or provide liaison directly to the JEOC as required by the situation.

4. Disposal Operations

4.1 General

Effective disposal operations will be those that are planned in advance and managed by knowledgeable and trained emergency managers and responders. Decisions on disposal may have to balance the interests of animal health officials, whose primary goal is to quickly eradicate the disease, with potentially competing concerns about environmental protection and safeguarding public health.

It is essential that disposal operations be carefully coordinated among all levels of government and producers, the public and other stakeholders.

A key to success will be the identification in advance of suitable disposal methods and facilities. There will be little time to do this once the animal carcass emergency is underway, and the benefits of advance preparation will be quickly evident.

The objective is to select the disposal method that offers the best disease control without creating unacceptable human health and environmental risks. More than one method of carcass disposal may be required and should be considered.

4.2 Disposal Protocols

The protocols for emergency carcass disposal depend primarily on the cause of mortality.

a) *Non-Infected Animals*

For non-infected animals the full range of disposal choices are available, with market or rendering being preferred options.

b) *Infected Animals*

For infected animals, emergency disposal methods must meet five key criteria:

- suitability (disease agent inactivation);
- legality (environmental protection);
- safety (public safety not compromised);
- practicality (time and cost efficient); and
- if a FAD is present, CFIA approval of the disposal method is required.

Disposal of infected carcasses may be on-site, depending on the type of carcasses and the cause of mortality, and is normally the

preferred option unless environmental and social factors dictate other choices. If movement of carcasses off-site for disposal is required, this must be carried out according to strict bio-security controls.

MAL is developing a comprehensive package of protocols which establish approved methods of disposal for each type of disease and animal species. The responsible office in the Ministry should be contacted for information on current protocols at the outset of any carcass disposal emergency.

MINISTRY OF AGRICULTURE AND LANDS:
(604) 556-3100 [Business hours]
 RESOURCE MANAGEMENT BRANCH, WASTE MANAGEMENT ENGINEER

4.3 Disposal Methodology

Primary disposal methodologies for use in an emergency are described at Annex B.

4.4 Local Disposal Options

The majority of land in the Chilliwack area is privately owned with unknown suitability for carcass disposal. In general, flood horizons, high water tables, key aquifers, urban development and slope gradients present significant obstacles with respect to mass disposal of carcasses.

Open-air burning is not acceptable in Chilliwack due to the sensitivity of the air shed.

Selection of suitable disposal methods will have to be made with due regard to environmental concerns, safety and public opinion. A range of options is available, as described below.

| Methodology | Notes |
|------------------|--|
| Market | <p>Market is the option of choice for non-infected carcasses.</p> <p>A carcass disposal emergency is likely to have a large number of carcasses from destroyed non-infected animals available for processing through normal channels. However, particularly in the early stages of an emergency, slaughter facilities might not continue to process livestock if there was no immediate prospect for sale.</p> |
| Rendering | <p>Rendering is a second option for non-infected carcasses. There is one rendering plant within reasonable distance of Chilliwack, West Coast Reductions Ltd (WCR), in Vancouver. WCR renders smaller animal carcasses on site and ships all ruminant and horse carcasses out of the</p> |

| | | |
|--|----------------------------|---|
| | | <p>area for processing, primarily to a subsidiary WCR plant in Calgary.</p> <p>If carcasses are infected contact WCR to see if they are able to receive the carcasses.</p> <p>NB: Rendering of cattle carcasses results in a by-product that has to be disposed of in accordance with SRM regulations.</p> |
| | <p>Composting</p> | <p>Composting can provide for the bio-containment and safe disposal of livestock and their wastes. New composting methodologies are being developed which reduce environmental impacts and accelerate destruction of pathogens and the degradation of carcasses.</p> <p>Composting is currently practiced by many of the area producers for routine mortality. Bin or windrow type composting is the norm.</p> <p>On-farm composting is the disposal option of choice in previous poultry disease emergencies in BC and is likely to remain so. Companies in the Chilliwack area with experience in and equipment for composting are listed at Appendix 1 to Section 5.</p> <p>NB: The end product from composting cattle carcasses must be disposed of in accordance with SRM regulations.</p> |
| | <p>Incineration</p> | <p>High-temperature incineration is a suitable disposal option. However, there are currently no large biological incinerators in Chilliwack or the surrounding area. Portable incinerators may be sourced but these have a relatively small capacity and may have a long lag time to obtain, assemble and set up.</p> <p>Large incinerators exist in the Swan Hills facility in Alberta, however costs and bio-security risks of long distance transport would have to be assessed for any emergency situation.</p> <p>NB: Incineration of cattle carcasses must meet specified critical temperatures in accordance with SRM regulations.</p> |

| | | |
|--|------------------------|---|
| | <p>Burning</p> | <p>Pyre (outdoor, fuel-fired) burning is an option for a limited number of animal carcasses where suitable areas exist. However, air quality issues, proximity to urban areas, public concerns and seasonal burning restrictions combine to make the open burning option generally unsuitable for the Chilliwack area.</p> <p>Air curtain burning utilizing a trench or contained system is more effective than pyre burning. An air curtain burning facility at the Simmilco mine site in Princeton has been used for carcass disposal in previous emergency events, albeit with mixed results. High fuel consumption per unit volume of carcasses is a negative aspect of this option.</p> <p>A list of suppliers of air curtain burning equipment is at Appendix 1 to Section 5.</p> <p>NB: Pyre burning is not suitable for cattle carcasses due to SRM regulations.</p> |
| | <p>Burial</p> | <p>On-site burial is an option for small numbers of carcasses where geological and hydrological conditions are suitable. MOE discourages on-farm burial if the area receives more than 600 mm (23.6 inches) of annual precipitation and/or the seasonal high water table depth is less than 2 m (6.6 feet) and/or the site is above an unconfined aquifer due to environmental concerns.</p> <p>While burial is normally a disposal method of choice, the high water table, combined with high rainfall, flood zones and extensive unconfined aquifers largely eliminates this option for Chilliwack. Steep slopes and shallow bedrock characterize the southern border of the area making this zone mostly unsuitable for carcass burial as well.</p> <p>Burial gets rid of the carcasses but the large volume of leachate generated and the residue within a burial site will persist for many years and ultimate elimination of the carcass material represents a long-term process. On-site burial must therefore be used cautiously for mass disposal.</p> |
| | <p>Landfill</p> | <p>There is only one public landfill in the city area, the Bailey Road Landfill, and it has significant limitations related to surface drainage, urban proximity and a high water table.</p> |

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| | <p>The Bailey Landfill is currently unable to accept carcasses for disposal. It would need significant expansion and upgrading to include full containment and leachate collection and treatment systems before carcass disposal could be considered.</p> <p>A profile of the Bailey Landfill site is at Appendix 2 to this section, including improvements desired by the City of Chilliwack.</p> |
|--|--|

4.5 On-site or Off-site Disposal

Historically, disposal of diseased carcasses was done on the infected premise to avoid spreading the infection by transporting the carcasses to an off-site facility. However, the two most common on-site disposal methods, burial and burning, have potentially serious environmental consequences.

On-site disposal is still the preferred option, however off-site methods may increasingly be used in emergencies, particularly for the carcasses of large animals. It is important to differentiate between limited disposal action for routine mortalities and the vast disposal challenges of, for example, a foot-and-mouth disease emergency. A decision to move the disposal activities off-site will be related to an analysis of the scale of event (i.e., the volume of material), potential human health concerns and environmental concerns.

For off-site disposal, the primary issue will be the transportation of carcasses in a safe, sanitary and timely fashion to avoid spreading the disease and/or endangering public health.

4.6 Transport of Carcasses

Transport of infected carcasses must be planned and executed with care, utilizing leak-proof vehicles approved for transporting hazardous material. Refrigerator trucks may be used.

Vehicles should not be overloaded – at least 18 inches, depending on distance to be travelled and temperature, should be left clear for expansion of carcasses. Smaller carcasses should be bagged if feasible and larger carcasses covered with a layer of poly sheeting. If vehicles are not enclosed, an airtight vinyl tarp should be placed over the top. All vehicles must be cleaned and disinfected before leaving the infected premise and after unloading.

Vehicles should travel on designated routes, preferably with an escort vehicle. They must travel slowly to avoid splashing of contaminated material, and a supply of an approved disinfectant should be carried to deal with minor spills enroute.

Carcasses and other items awaiting disposal should be secured to prevent unauthorized access and to prevent wild animals and birds removing potentially infectious material. Control of insects should be considered if there is a risk of passive transmission by insects to nearby susceptible species. If disposal is delayed, carcasses should be thoroughly sprayed with an approved disinfectant.

Federal and provincial protocols for the transportation of FAD material are under development by CFIA/MAL. Once issued, these protocols will guide decisions on applicable transportation issues.

4.7 Specified Risk Material

The *Health of Animals Act* regulates the handling of specified risk material (SRM). SRM are tissues that, in BSE-infected cattle, have been shown to contain the infective agent and transmit the disease.

The handling of bovine carcasses is affected by the SRM regulations. Regulations on the handling of SRM in landfills and by other disposal methods are currently under development in CFIA.

As the mass disposal of bovine carcasses will present unique issues with respect to SRM handling, guidance for specific situations must be sought from CFIA before any decision on the disposal or movement of bovine carcasses is taken.

4.8 Making Choices

Selection of an appropriate methodology for carcass disposal in an emergency is situation dependent – choices must be based on the animal species involved, the scale of the mortality, environmental concerns, public opinion and other factors.

The selection of a preferred method of disposal will usually be determined by the cause of death. When a natural disaster is the cause, the disposal method chosen should be the most environmentally acceptable. If the death was due to an infectious organism, then the method that most efficiently prevents further disease spread is usually the preferred choice, while taking all possible actions to protect the environment.

The animal species involved will be a major consideration. The choices potentially available in the Chilliwack area for *infected carcasses* will normally be:

| Priority | Methodology | Notes |
|----------|-------------------------------------|---|
| 1 | Composting (on-site) | On-site is the preferred option, particularly for poultry. |
| 2 | Incineration or air-curtain burning | See Appendix 1 to Section 5 for sources of burners. Air curtain burning is not suitable for cattle carcasses. |

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| 3 | Burial (on-site) | Limited by water table issues in Chilliwack. May only take place if site is specifically approved by MOE. |
| 4 | Approved landfill | Limited by lack of approved facilities. |
| 5 | Rendering | The WCR rendering plant is currently not approved for infected carcasses. If approval is obtained this would be a preferred option. |
| 6 | Burial (off-site) | Only if environmentally suitable sites can be identified. Sites must be specifically approved by MOE. |

The choice of disposal option must always be made in close consultation with MAL and/or CFIA.

The range of choices for *non-infected* carcasses is less complex, with market being the first choice in most cases. Composting or rendering may be selected if the market option is not possible, however SRM regulations still apply to bovine carcasses.

In a large scale disaster, the volume of carcasses created will influence the method of carcass disposal. The significant partners in a carcass disposal emergency (environmental, animal health and emergency management officials) possess specialized expertise, all of them must contribute to the final disposal decisions. Public opinion will always be a factor.

The final consideration is that when public health issues are involved, mitigation of harm to humans must take priority.

The MAL disposal protocols, currently under development, will provide detailed information concerning disposal choices. The Ministry must be contacted for current information prior to any final decisions about disposal methods being made.

MINISTRY OF AGRICULTURE AND LANDS:
(604) 556-3100 [Business hours]
 RESOURCE MANAGEMENT BRANCH, WASTE MANAGEMENT ENGINEER

Appendix 1 to Section 4 Bailey Landfill Profile

The landfill site is located within the city corporate limits, approximately six kilometers south of the city centre, at the south end of Matheson Road. The site is bounded by Matheson Road to the west, Bailey Road to the north and Teskey Way to the east and south.

The landfill property is approximately 48 hectares and includes an approved waste limit of approximately 12.5 hectares within a permitted area of 18.6 hectares.



The site is located in the Fraser River Valley portion of the sub-region that is formed by the valley between the Coast Mountain range and the Cascade Mountain range. Glaciation has contributed a wide range of surficial materials in which the majority of the soils have formed. The surficial terrain is underlain mainly by intrusive igneous rock that is relatively resistant to weathering. Soil resulting from alluvial and fluvial deposits provides a coarse textured, slightly acid soil. In general the vegetation is a coniferous forest blanket.

The design of the site includes engineered controls for groundwater, surface water and leachate. The groundwater management system consists mainly of sub-liner collection pipes that are used to collect the groundwater from the glacial outwash sand and gravel layer, located at the southern boundary, and convey it to the surface watercourse away from the landfill footprint. In addition this precludes stability issues with the landfill and liner and reduces the amount of water available for leachate generation.

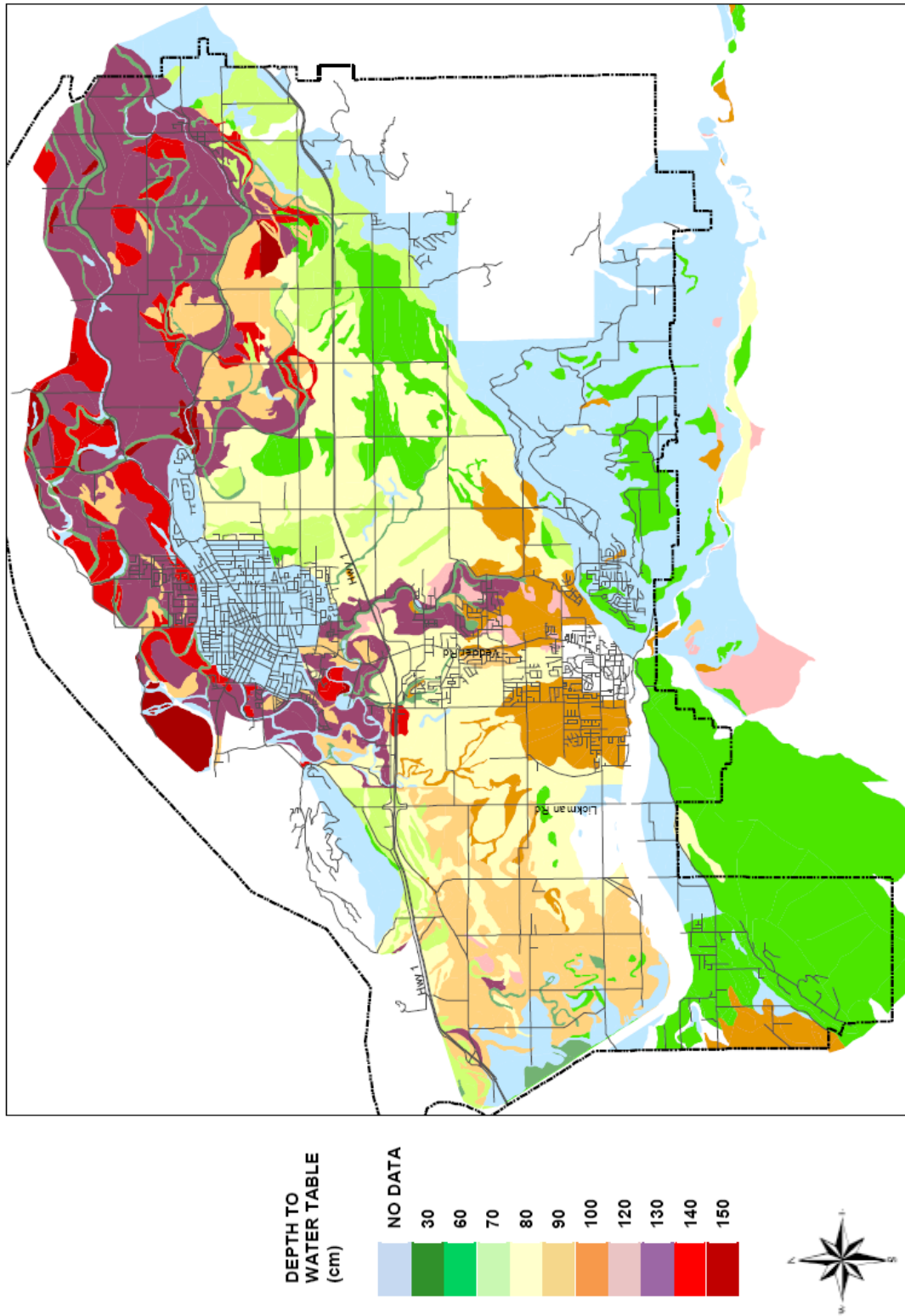
The surface water management system includes lined and unlined ditches, diversion channels, down-chutes and culverts used to convey surface water around and away from the landfill footprint.

The leachate collection system includes a perimeter collector along the north edge of the landfill footprint, collectors within the waste in the unlined portion of the landfill and a liner and under-drain collection system in the lined portion of the landfill.

Potential Improvements to the Bailey Landfill

The City of Chilliwack is currently analyzing methods to expand and improve the Bailey Landfill. **If these improvements are approved and funded there could be more scope for carcass disposal.** Desired improvements include engineered controls for leachate management and surface water management, with the potential to integrate active landfill gas collection into the design. The existing landfill footprint could be expanded to increase the waste limit to approximately 16 hectares from the existing 12.5 hectares. Suitable buffer areas are included in the conceptual design.

Appendix 2 to Section 4 Chilliwack Depth to Water Table Profile



5. Disposal Resources

5.1 General

The key to managing mass carcass disposal lies in the identification and provision of appropriate resources. This includes resources for the storage and transportation of carcasses as well as those needed for the actual disposal.

Each mass carcass disposal event will be unique, and therefore no complete list of required disposal resources can be developed. The resources will always need to be specifically tailored to the situation.

5.2 Resource Requirements

Disposal resources for carcass disposal will normally include transportation, heavy equipment and protective/safety equipment for personnel. The following generic list is provided for planning guidance:

- Transportation:** Trucks up to 1-ton for equipment transport.
Vans/minibuses for personal transport.
Approved vehicles for transporting hazardous material (refrigerator trucks may be used).
- Heavy Equipment:** Excavator (for burial operations).
Grader (for burial operations).
Tractor with front-end loader.
Backhoe with front-end loader.
Midsize skid-steer loader.
Front-end loader.
Small bulldozer.
Water tanker (if no water source at sites).
- Light Equipment:** Motorized pressure spray unit (cleaning, washing and disinfection of vehicles and containers)
Generators, various capacity.
Air curtain burners.
Portable incinerators.
Pumps.
Compressors.
- Safety and Security:** Warning signs.
Portable disposal site lighting.
Road pylons.
Site marking tape.
Identification badges.

5.3 Specialized Disposal Resources

- Personal Protection:** Protective clothing including footwear.
Coveralls (for temporary visitors to disposal sites).
Masks or respirators.
Decontamination equipment and chemicals.
Medications such as anti-virals (controlled by medical staff).
Portable toilets.
Temporary shower and changing facilities.
Clothes washing facilities.
Walk-through footwear disinfectant facility.

- Miscellaneous:** Tow chains.
Bins for temporary storage of carcasses.
Bags if required for transport of small carcasses.
Poly sheeting and tarpaulins.
Plastic film.
Garbage cans and/or metal bins.
Disinfectant.
Lime.
Digging tools.
Cleaning and disinfectant supplies.
Hand tools (shovels, picks, rakes, etc).
Pickets.
Composting thermometers.
Carbon source (litter, sawdust, etc).
Water hoses.
Fuel for pyres.
Cellphones.
Digital cameras or camcorders.

- Documentation:** Office equipment and supplies.
Forms and templates.
Printing facilities.

Specialized equipment lists for selected disposal methodologies are at Annex C.

Specialized disposal resources may also be required in certain circumstances. They include a broad range of items from professional engineering, environmental and geotechnical consultants to specialized equipment and supplies. Examples are:

- a) mobile incinerators;
- b) container equipment;
- c) generators; and

- d) decontamination equipment and chemicals.

5.4 Resource Availability

The Chilliwack Public Works Department has a comprehensive inventory of transportation resources, heavy equipment and construction supplies. An equipment list for the department is at Appendix 1 to Section 5.

Local suppliers/contractors can provide a wide range of resources and equipment to supplement city holdings. A list of potential suppliers is at Appendix 2 to Section 5.

The city also has personnel resources with expertise in key areas such as engineering, utilities, environment, GIS, emergency response and other disciplines that may be required in an mass mortality emergency.

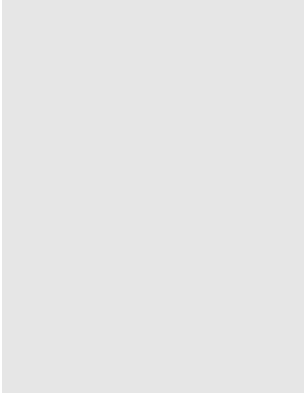
5.5 Resource Shortfalls

Resource or capacity shortfalls exist in the following areas:

- a) **Incinerating Capacity.** There are no large biological incinerators in Chilliwack or the surrounding area. Portable incinerators may be sourced but these have a relatively small capacity.
- b) **Rendering Capacity.** The one readily available facility, West Coast Reductions, has little surge capacity and already ships ruminant and horse carcasses to Calgary for processing. A planned second plant, with the capacity to handle SRM, may mitigate this shortfall.
- c) **Infected Carcass Transportation Capacity.** The number of vehicles suitable for transporting hazardous material, which are necessary for the carriage of infected carcasses is limited. Additional vehicles may have to be contracted from outside the area in the event of a major emergency.
- d) **Landfill Capacity.** The Bailey Landfill is unsuitable for carcass disposal without a planned upgrade (see Appendix 2 to Section 4).
- e) **Personal Protective Clothing.** The City of Chilliwack does not hold stocks of personal protective clothing for individuals who may have to visit infected premises or handle carcasses in a disposal emergency.

5.6 Disposal Challenges

Other challenges related to the City of Chilliwack's ability to respond to a carcass disposal emergency are:



- a) **Burial** for large carcass volumes is excluded for most of the area due to high water tables, flood horizons, key aquifers and heavy seasonal rainfall.
- b) **Burning** is a limited option, either on- or off-site, due to the sensitivity of the local air shed.
- c) Off-site **composting** will require careful site screening to confirm water tables, drainage and availability of the necessary composting materials.

Appendix 1 to Section 5 Chilliwack Public Works Department Equipment List

Vehicles

| | |
|---------------------------|----|
| Truck ¼ ton | 26 |
| Truck ½ ton | 9 |
| Truck ¾ ton | 5 |
| Truck Light | 13 |
| Truck Single Axle | 8 |
| Truck Single Axle w/crane | 2 |
| Truck Dump Single axle | 5 |
| Truck Dump Tandem axle | 5 |

Heavy Equipment

| | |
|-----------|---|
| Backhoe | 4 |
| Grader | 4 |
| Loader | 1 |
| Sweeper | 3 |
| Tractor | 5 |
| Excavator | 2 |
| Fork Lift | 1 |

Other

| | |
|------------------|---|
| Trailers | 6 |
| Chipper | 1 |
| Generator 2.2 kw | 1 |
| Generator 30 kw | 1 |
| Generator 48 kw | 1 |
| Generator 125 kw | 2 |
| Generator 200 kw | 1 |
| Generator 600 kw | 1 |
| Pumps | 3 |
| Compressor | 1 |
| Boat 14 ft | 1 |

The Public Works Department also has a comprehensive holding of miscellaneous equipment including spreaders, aerators, grinders, etc. A complete list of holdings is included in the *Public Works Emergency Plan*.

Appendix 2 to Section 5 Disposal Resource and Equipment Suppliers

Composting Services and Equipment

| Supplier | Services/Resources |
|---|--|
| ALRAY Shavings Ltd. Greendale (604) 823-6296 | Operates specialized composting facility. |
| Denbow Transport Ltd. 40874 Yale Road Chilliwack (604) 823-6647 | Shavings and sawdust for composting, with blower trucks for delivery. |
| Jim Parkes Cultus Lake (604) 858-9059 | Dead stock composting service. |
| Pacific Forage Bag Supply Ltd. 4404-50 th Street Delta (604) 946-5025 | Bags and other items for composting. |
| Robertson Farms Ltd Box 21, Grindrod (250) 838-2137 | Composting services (has to contract/rent specialized equipment). |
| Transform Compost Systems Ltd 211-33119 South Fraser Way Abbotsford (604) 504-5660 | Broad range of composting services including farm waste and mortalities. Provided composting services and advice during 2004 AI event. |
| Vischer Shavings Inc 6545 Lickman Rd Chilliwack (604) 858-0373 | Shavings and sawdust for composting. |

Air-Curtain Burners

| Supplier | Services/Resources |
|---|---|
| ABY-2 Environmental Prince George Bill Barnes (250) 614-1483 | Locally manufactured auxiliary fuel-fired (propane) portable air curtain burner with under-fire and over-fire air and continuous ash removal. |
| Air Burners, LLC Marketing and Sales Department 4390 Cargo Way Palm City, Florida 34990, USA 1-888-566-3900 | Manufactures above-ground air curtain destructors and in-ground trench burner systems utilized for wood waste disposal and disaster recovery operations including carcass disposal. |

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| <p>Envirogreen Technologies Ltd. Suite 480, 4400 Dominion Street, Burnaby (604) 689-53236</p> | <p>Operates incineration facility and provides environmental remediation services.</p> |
| <p>Industrial Cleanburn 7796 Mays Road Duncan Tom Mitchell (250) 746-1918</p> | <p>Sell, rent, lease and contract air curtain units manufactured in USA.</p> |
| <p>Bruce Lougheed Box 76, Heffley Creek (250) 578-7532</p> | <p>Portable, trailer-mounted air curtain destructor</p> |
| <p>WAYCON Manufacturing Ltd 275 Waterloo Ave Penticton 1-877-492-7718</p> | <p>Manufactures ABC Destructor, a trailer-mounted portable air curtain destructor.</p> |
| <p>Western Destructor Burn Box 1199 Salmon Arm Joe Burnett (604) 240-1111</p> | <p>Manufactures air curtain trench burners for sale/rental. System includes trench construction and over-fire air curtain with under-fire air if required.</p> |

Transportation Services

| Supplier | Services/Resources |
|--|--|
| <p>Greenwave Farms Ltd. RR#4, Enderby (250) 838-2250 [Fraser Valley: Steve Berdonck, (604) 835-4121]</p> | <p>Transportation of carcasses, contract hauler for West Coast Reductions Ltd.</p> |
| <p>West Coast Reduction Ltd. 105 North Commercial Drive Vancouver (604) 252-2087</p> | <p>Pickup and rendering service for slaughter and meat processing waste. Has significant transportation assets including sealed container trucks and daily collection services for waste material from slaughter houses, meat packers and farms.</p> |

Meat Processing / Rendering

| Supplier | Services/Resources |
|---|--|
| <p>Johnston Packers Ltd. 5828 Promontory Road Chilliwack (604) 858-4121</p> | <p>Cattle, pig, sheep, llama, alpaca processing.</p> |
| <p>Canada West Foods Ltd. 206-46165 Yale Road Chilliwack (604) 795-4774</p> | <p>Cattle processing.</p> |

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| Windmill Meats Ltd. 5567 Steetaws Road Chilliwack, BC (604) 819-3852 | Cattle processing. |
| Scott's Meats Ltd. RR#2, 2310 Scott Rd Agassiz (604) 796-9002 | Cattle processing. |
| AGM Beef Farm Ltd. A1 Grand'Maison 5175-184 Street Cloverdale (604) 576-8318 | Cattle, sheep, llama, alpaca processing. |
| Britco Pork Inc 22940 Fraser Highway Langley (604) 533-3911 | Swine processing. |
| Fairline Development Cdn (1992) Ltd. 2391 Vauxhall Place Richmond (604) 276-2886 | Poultry processing. |
| Fraser Valley Duck and Goose Ltd. 4540 Simmons Road Chilliwack (604) 823-4435 | Poultry processing |
| Wing Tat Game Bird Packers 9752-186 Street Surrey (604) 882-0054 | Poultry processing. |
| K&R Poultry / Farmfed 31171 Peardonville Road Abbotsford (604) 850-5808 | Poultry processing. |
| Hallmark Poultry Processors Ltd. 1756 Pandora Street Vancouver (604) 254-9885 | Poultry processing. |
| Lilydale Inc. 1910 Kingsway Avenue Port Coquitlam (604) 941-4041 | Poultry processing. |
| Sunrise Poultry Processors Ltd. 13542 73A Avenue Surrey (604) 596-9585 | Poultry processing. |

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| United Poultry Co. Ltd. 534 East Cordova Street Vancouver (604) 255-9308 | Poultry processing. |
| West Coast Reduction Ltd. 105 North Commercial Drive Vancouver (604) 252-2087 | Rendering. |

6. Finance and Administration

6.1 General

Provincial guidelines and regulations for financial management in an emergency are contained in the *Emergency Program Act* and its *Compensation and Disaster Financial Assistance Regulation*.

Some financial information for emergency situations is also provided in the *MAL Emergency Response Plan, 2006*.

It is important to note that the financial programs which apply to compensation for animal mortality in an emergency are separated between provincial programs which apply during a non-FAD emergency, and federal programs which apply when a FAD is present. In the latter case, claims are normally made directly by producers to the applicable federal agency, either through the *JEOC Compensation Unit* or under other arrangements promulgated by federal authorities.

Instructions regarding compensation and application procedures will be issued during an animal health emergency by PEP and/or CFIA as applicable.

6.2 Provincial Programs

Producers who suffer losses through farmed animal mortalities from causes other than a FAD may be eligible for *Disaster Financial Assistance* arranged through PEP. This program is for uninsurable losses.

The PEP financial guidelines applicable to farmers and ranchers are contained in *Disaster Financial Assistance Guidelines For Private Sector*. The Guidelines may be reviewed at:

http://www.pep.bc.ca/dfa_claims/Private_Sector_DFA_Guidelines_Nov06.pdf

Financial assistance from PEP may also be provided to local authorities for specified types of response and recovery costs. The PEP financial guidelines for local governments are contained in *Financial Assistance for Emergency Response and Recovery Costs – A Guide for BC Local Authorities and First Nations, September 2005 (Revised September 2006)*. This document may be reviewed at: http://www.pep.bc.ca/dfa_claims/Financial_Assistance_Guide-Final-2005_09_01.pdf

6.3 Federal Programs

Owners of animals ordered destroyed during a FAD emergency may be compensated directly by the federal government under the federal *Health of Animals Act* and *Regulations*. Compensation under these regulations will normally be arranged through the

| | |
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| | <p>JEOC, or may be arranged directly between producers and the applicable federal agency when no JEOC has been established.</p> <p>The <i>Compensation for Destroyed Animals Regulations</i> establish the maximum amount of compensation payable for an animal that is required to be destroyed in a FAD emergency. The <i>Regulations</i> are available online at: http://laws.justice.gc.ca/en/h-3.3/sor-2000-233/217074.html.</p> <p>Compensation awarded to owners is determined by an assessment of the market value of an animal and takes into consideration factors such as genetic background, age and production records. The assessment is made by a team of experts that includes the CFIA veterinary inspector and two evaluators – one chosen by the owner and the other by the CFIA.</p> <p>The compensation awarded is subject to maximum levels set out in the <i>Regulations</i>. The owner is awarded market value less the value of the carcass received if salvage is possible, but if the animal's market value is equal to or exceeds the maximum allowed, the owner is awarded the maximum compensation amount.</p> <p>Owners of animals ordered destroyed may also be awarded compensation for disposal costs including transportation, slaughter, labour, and equipment.</p> |
| 6.4 First Nations | <p>First Nations in BC qualify for federal assistance for emergency response, including eligible costs for animal services. The provincial and federal governments have agreed to work together in providing financial assistance to First Nations.</p> <p>First Nations are required to prepare and submit their own claims for response costs to PEP, even if they participate with a local authority or with the Ministry in response.</p> <p>First Nations are subject to the same eligibility and documentation requirements for disaster financial assistance in BC that apply to local authorities (see Section 6.2 above).</p> |
| 6.5 Application Procedures | <p>Authorization and application procedures for financial compensation will be confirmed and promulgated on an event-specific basis, by PEP and/or CFIA.</p> |
| 6.6 Compensation Q&A | <p>Local government may expect to receive queries on compensation issues from producers who have experienced animal mortality during an emergency. Some common <i>Questions and Answers</i> are provided at Appendix 1 to this section.</p> |

6.7 Requirement for Record Keeping

The key to receiving prompt payment of submitted response costs, disaster financial assistance or compensation claims is good record keeping. All claims must be properly documented with supporting receipts or other written justification.

The EOC for carcass disposal operations must receive and retain all mortality documentation and ensure that the following minimum items are documented:

- a) names and contact numbers of person reporting animal mortality;
- b) dates of disposal;
- c) species of animals, numbers and locations of origin;
- d) selected method of disposal and locations;
- e) follow-up actions required to monitor and remediate disposal site;
- f) soil and water testing results;
- g) names and contact numbers of experts utilized in disposal operations; and
- h) environmental assessments pursuant to *Canadian Environmental Assessment Act*.

Detailed record keeping of carcass burial sites is particularly important, including the following essential information on each site:

- a) exact location in relation to a fixed point;
- b) the date of burial;
- c) the type and size of carcasses buried;
- d) the approximate total weight of the carcasses; and
- e) the cause of death.

Appendix 1 to Section 6 Compensation Questions and Answers

Q1. All of my animals were destroyed during the recent FAD emergency. How much can I expect to be compensated?

A1. Each animal is evaluated and its market value is determined; however, the compensation awarded is subject to maximum levels set out in the *Compensation for Destroyed Animals Regulations*. Maximum compensation amounts may be found in the *Regulations*. Examples of current amounts for common farm stock are:

| | | |
|---------|---------|--|
| Cattle | \$2,500 | It should be noted that these amounts are currently under review (Dec 2006) and a new table of proposed payable amounts has been published in the <i>Canada Gazette, Vol 140, No. 46</i> . The proposed amounts may be reviewed at http://canadagazette.gc.ca/part1/2006/20061118/html/regle1-e.html |
| Horse | \$2,750 | |
| Swine | \$800 | |
| Sheep | \$600 | |
| Chicken | \$33 | |

Q2. In addition to compensation for each animal destroyed during an FAD emergency, are there other costs for which I may be reimbursed?

A2. Yes – under the *Compensation for Destroyed Animals Regulations*, owners of animals ordered destroyed may also be awarded compensation for disposal costs such as transportation, slaughter, labour, and equipment.

Q3. My prize-winning registered bull was destroyed in a recent FAD emergency. Can I be reimbursed for the replacement value of the bull?

A3. Current regulations permit reimbursement only up to the maximum values listed in the *Compensation for Destroyed Animals Regulations*. The proposed amendments to the *Regulations* contain categories which have higher maximum amounts for registered animals, grandparent poultry breeder flocks and male cervids to allow recognition of the genetic value of these animals.

Q4. I believe that I have an entitlement to Disaster Financial Assistance to compensate me for animals lost in the recent wildfire emergency. How do I apply for DFA?

A4. PEP will coordinate the processing of private sector claims and will provide local advice on the application process. It can be anticipated that PEP will provide this advice to potential claimants and it may be done through newspaper notices and/or arranging public meetings in affected communities.

Q5. The horses and goats on my hobby farm were drowned in the recent floods and I can't afford to replace them. Am I entitled to Disaster Financial Assistance?

A5. In such events Disaster Financial Assistance is limited to farmers and ranchers whose livelihood is based on their farming and ranching activity.

7. Recovery

7.1 General

In most cases, disposal operations will be conducted within a larger emergency scenario. There will therefore be no recovery phase or process linked directly to disposal operations. Rather, it will be related to the foreign animal disease or other event within which the animal mortality occurred. The recovery phase may include activities to support restocking, re-establishing markets and rebuilding viable industry activities.

Recovery serves several linked objectives, including:

- a) administering financial compensation for critical losses incurred (as outlined in Section 6);
- b) capturing lessons learned during the emergency so that they may be applied to any future emergency response;
- c) re-establishing the local livestock industry to pre-emergency levels and capabilities as cost-effectively as possible; and
- d) providing community support for those who have suffered severe impacts from the event.

Environmental issues related to disposal will also be key to a successful recovery. Monitoring of disposal sites will be required over a specified period to ensure that appropriate environmental safeguards are in place and there is no degradation of the sites which could have long-term environmental impacts.

7.2 Recovery Objectives

Recovery objectives may include damage assessment, restoration and reconstruction, economic impact studies and financial assistance.

Local authorities will lead activities designed to support animal producers, in conjunction with industry associations and other producer groups.

7.3 Recovery Organization

A small recovery team will be required to guide the recovery process. The composition of the team will depend on the scale and extent of the emergency, and the scale of carcass disposal. Local authorities should work closely with any provincial recovery team that may be instituted.

7.4 After-Action Report

On the completion of response activities an *After-Action Report* (AAR) should be prepared. The primary purpose of the AAR is to document the lessons learned from the experience.

Core questions to be addressed in the AAR include:

- a) What went right?
- b) What went wrong? and
- c) How can we improve?

The intent of this step is not to find fault, but to uncover opportunities for improving plans, procedures, equipment, and personnel training for the district's emergency program.

The Emergency Program Coordinator is responsible for ensuring that an AAR is completed and that all documented records are complete and available for internal review.

ANNEXES

Annex A Animal Diseases

Foreign Animal Diseases

The following diseases are currently listed by the OIE as transmissible diseases that have the potential for very serious socio-economic or public health consequences, and are of major importance in the international trade of animals and animal products:

| | |
|-----------------------------------|----------------------------|
| African Horse Sickness | Newcastle Disease |
| African Swine Fever | Peste des Petits Ruminants |
| Bluetongue | Rift Valley Fever |
| Classical Swine Fever | Rinderpest |
| Contagious Bovine Pleuropneumonia | Sheep Pox and Goat Pox |
| Foot and Mouth Disease | Swine Vesicular Disease |
| Highly Pathogenic Avian Influenza | Vesicular Stomatitis |
| Lumpy Skin Disease | |

Reportable Diseases – Federal

The following are reportable diseases per the *Reportable Diseases Regulations* pursuant to the *Health of Animals Act*.

| | |
|--|---|
| African horse sickness | Highly pathogenic avian influenza |
| African swine fever | Hog cholera (classical swine fever) |
| Anaplasmosis | Lumpy skin disease |
| Anthrax | Newcastle disease |
| Bluetongue | Peste des petits ruminants |
| Bovine spongiform encephalopathy | Pseudorabies (Aujeszky's disease) |
| Bovine tuberculosis (<i>M. bovis</i>) | Pullorum disease (<i>S. pullorum</i>) |
| Brucellosis | Rabies |
| Chronic wasting disease of cervids | Rift Valley fever |
| Contagious bovine pleuropneumonia | Rinderpest |
| Contagious equine metritis | Scrapie |
| Cysticercosis | Sheep and goat pox |
| Equine infectious anaemia | Swine vesicular disease |
| Equine piroplasmiasis (<i>B. equi</i> and <i>B. caballi</i>) | Trichinellosis |
| Foot and mouth disease | Venezuelan equine encephalomyelitis |
| Fowl typhoid (<i>Salmonella gallinarum</i>) | Vesicular stomatitis |

Reportable Diseases – Provincial

The following diseases are reportable under the BC *Animal Disease Control Act*:

Tuberculosis
Brucellosis

The following are "infectious or contagious diseases" as defined by the *Animal Disease Control Regulations* of BC and must be reported:

Infectious Laryngotracheitis (Avian)
Mycoplasma gallisepticum of turkeys

Diseases with High Potential for Mass Mortality

Following is a list of diseases with a *likelihood of occurring* of possible, likely or certain, and a *risk to animal health* of medium, high or very high. The diseases identified as zoonotic potentially present a risk to human health:

| Disease | Likelihood | Risk to Animal Health | Zoonotic Status (Risk to Human Health) ^{Note 1} | Species at Risk |
|--|---|--|--|--------------------|
| | Rare Unlikely Possible Likely Certain | Very Low Low Medium High Very High | Yes/No If zoonotic: (Insignificant) (Low) (Moderate) (High) | |
| Anthrax (<i>Bacillus anthracis</i>) | Possible | High | Yes (Moderate) | Multiple |
| Avian Infectious Laryngotracheitis (Herpesvirus) | Certain | Very High | No | Avian |
| Avian Influenza – highly pathogenic (Orthomyxovirus) | Likely | Very High | Yes (Low to High, strain dependent) | Avian |
| Bovine babesiosis (<i>Babesia bovis</i>) | Possible | Medium | Yes (Moderate) | Cattle |
| Classical Swine Fever or Hog Cholera (<i>Pestivirus</i>) | Possible | High | No | Swine |
| Epizootic haemorrhagic disease (Orbivirus) | Likely | High | No | Multiple |
| Foot and Mouth Disease (<i>Picornavirus</i>) | Possible | High | No | Multiple |
| Fowl Cholera (<i>Pasteurella multocida</i>) | Certain | Very High | Yes (Low) | Avian |
| Newcastle Disease – Velogenic (exotic) (Avian paramyxovirus) | Possible | Very High | No | Poultry |
| Viral haemorrhagic disease of rabbits (Calicivirus) | Possible | High | No | Lagomorph (rabbit) |
| West Nile Fever (West Nile virus) | Possible | Medium | Yes (Insignificant) ^{Note 2} | Equine |

Note 1: The risk to human health is relative (the risk posed by anthrax is higher than that for Newcastle, etc, however in an absolute sense even the risk of anthrax is low).

Note 2: Although West Nile Virus is zoonotic, infected horses present no risk to human health.

**Annex B
Disposal Methodology Options**

| Methodology | Description |
|--------------------|---|
| Market | <p>The market option involves the commercial sale of non-infected animals, usually resulting from pre-emptive slaughter for the purposes of containing the spread of disease. Marketing should be undertaken whenever possible.</p> |
| Rendering | <p>Rendering of animal carcasses involves conversion of the carcasses into three end products – carcass meal, melted fat or tallow, and water – using mechanical processes (grinding, mixing, pressing, decanting and separating), thermal processes (cooking, evaporating, and drying), and sometimes chemical processes (e.g., solvent extraction).</p> <p>The main carcass rendering processes include size reduction followed by cooking and separation of fat, water, and protein materials using techniques such as screening, pressing, sequential centrifugation, solvent extraction and drying. Resulting carcass meal can sometimes be used as an animal feed ingredient. If prohibited for animal feed use, or if produced from keratin materials of carcasses such as hooves and horns, the product will be classified as inedible and can be used as a fertilizer. Tallow can be used in producing livestock feed or the manufacture of soaps.</p> <p>A satisfactory rendering process would involve grinding the raw product, solvent extraction of lipids at about 100 °C for one hour and high temperature treatment of both carcass meal and tallow for at least a further 40 minutes. The end product of rendering must pass microbiological tests before release.</p> <p>Rendering is a useful alternative for carcass disposal including infected animals where the service is available (the WCR plant in BC is not approved for rendering of infected carcasses). However, rendering plants have minimal surge capacity and may not be able to accept large numbers of carcasses in an emergency.</p> |
| Composting | <p>Composting is the controlled biological decomposition and conversion of solid organic material into a humus-like substance called compost that can safely be used as a soil amendment. The process is aerobic, meaning it requires the presence of oxygen. Natural microorganisms such as bacteria and fungi break down the complex organic compounds into simpler compounds.</p> <p>Composting is cost-effective, environmentally sound and bio-secure provided that the compost is managed correctly (e.g., high temperatures are maintained and leachate is controlled effectively). Most pathogens are destroyed during the composting process. In-barn composting is the favoured option for poultry because it limits odour, enhances bio-security and is away from view. If this is not possible, the entire process can be handled</p> |

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| | <p>outdoors.</p> <p>Large animals can be successfully composted if the process is properly established and maintained. Composting also has the advantage of keeping infected material on site.</p> <p>Site selection is of key importance for composting operations. Considerations include:</p> <ul style="list-style-type: none"> – sites should be at least 30 metres away from wells or watercourses; – sites should be level and not prone to flooding; – runoff and/or leachate must be contained to protect surface and ground water; and – sites should be shielded from public view and secure from predators. <p>Flood-prone areas, steep slopes and bedrock must be avoided. Sites should be on high ground with good drainage and where pooling of water does not occur. A preferred base is a concrete pad, asphalt or packed gravel. However, a field with vegetative cover is acceptable if leachate can be effectively contained. The composting site must be at least 1 metre above the high water table level and 30 metres from any water source used for domestic purposes. Also, wildlife or domestic animals must be prevented from gaining access to composting carcasses.</p> <p>Partial composting, or bio-heat treatment, may also be used in some circumstances, particularly with poultry carcasses. Virus inactivation is achieved, but visually the end-product has not matured to the same level of biological decomposition as true compost.</p> |
| <p>Incineration</p> | <p>High temperature incineration is a method of thermal destruction of both the carcass and pathogens by converting volatile gases, vapours and particulate matter into carbon dioxide, water and ash. Properly designed and operated, biological incinerators produce a stack gas that is largely free of odours and particulate matter.</p> <p>Biological incinerators provide a very efficient carcass disposal system, achieving safe and complete disposal with the absence of virtually any pollution. However, their cost and lack of portability means they are unlikely to be readily available or easily accessible in many situations. Incinerators are usually only suited to disposal of small amounts of material.</p> |
| <p>Burning</p> | <p>Open burning of animal carcasses creates smoke that is extremely high in particulate matter and produces offensive odours. Accordingly, it is normally suitable for only a small number of animals (i.e., less than six bovine units). It may be conducted in above-ground pyres or in trenches, and requires the use of accelerants such as diesel fuel or auxiliary fuel such as wood and straw to achieve the combustion temperatures necessary for the complete destruction of animal carcasses.</p> |

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| | <p>Air curtain burning is a technique for burning material in a pit aided by fan-forced air. The equipment consists of a large capacity fan and ducting to deliver the air, which may be preheated, down into the long side of a trench. The angle of the airflow results in a curtain of air acting as a top for the incinerator and provides oxygen that produces high burn temperatures. Sufficient hot air recirculates within the pit, achieving complete combustion. Additional fuel is required to initially establish combustion, but once operating the continuing fuel requirement is reduced. The use of misters can reduce the air emission concerns normally associated with open air-curtain technology.</p> <p>Air curtain burners are suitable for continuous operation, albeit on a relatively small scale and have the advantage of being transportable. Using an air curtain burner can significantly enhance the efficiency of open burning. Burning results in the destruction of most pathogens, reduces the volume of solid wastes and minimizes the impact on water quality. Residues left over from burning must be buried, composted or transported to a landfill.</p> |
| <p>Landfill</p> | <p>Depositing dead animals in a local landfill has been commonly used for disposal of a small numbers of large animal carcasses or a larger number of small animal carcasses.</p> <p>Only landfills that satisfy requirements with respect to flooding and aquifers, engineered containment, leachate management and gas management regimes should be considered for mass carcass disposal.</p> <p>Carcasses disposed in a landfill undergo chemical, bacteriological, and physical changes. Depending on the material and site conditions, decomposition in a landfill can proceed very slowly over a long period of time, in widely varying temperatures that are inadequate for the inactivation of heat resistant organisms and spore formers. There is also a potential for groundwater and surface water contamination from the release of landfill leachate, and the off-site migration of carbon dioxide, and methane gases. Small amounts of poisonous and noxious gases including hydrogen sulfide may also be emitted from landfills.</p> |
| <p>Burial</p> | <p>Mass livestock carcass burial requirements include the need for at least four meters of soil above the water table or bedrock, and separation distances of 122 meters from any well and 50 meters from a dugout, pond, stream, river or the property boundary. Also, flood prone areas and unconfined aquifers are excluded.</p> <p>Maximum loading rate for non-emergency on-site carcass burial is 700 kg per hectare per year. For mass burial in off-site locations, the loading rate will be determined by environmental considerations and must be determined in conjunction with MAL, MOE and MOH. Experience in past emergency events suggests a loading rate not exceeding approximately 15 cattle, 90 swine, 150 sheep or 800 poultry carcasses per hectare per year, in environmentally acceptable sites, for mass carcass disposal in a major emergency.</p> |

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| | <p>Environmental risks associated with burial include:</p> <ul style="list-style-type: none"> – holding (burial) sites that result in surface and/or soil pollution and/or air pollution; – flies or rodent attraction that results in possible disease transfer to people, livestock or wildlife; and – attraction of predators to the site. <p>Important considerations for burial site selection include:</p> <ul style="list-style-type: none"> – <i>access to the site</i>: for both equipment to dig the burial pit and for the delivery of livestock, carcasses or other materials to be buried; – <i>environmental</i>: distance to watercourses, bores and wells; height of water-table; proximity to buildings, especially houses; proximity to neighbours or public lands including roads; slope of the land and drainage to and from the pit; permeability of soil; sufficient space for temporary storage of overburden; and direction of prevailing wind (odour); – <i>construction considerations</i>: avoid rocky areas (slows digging and increases costs) but select soils with good stability capable of withstanding the weight of equipment used to construct and fill the pits. Surface runoff should be prevented from entering the pit by the construction of diversion banks if required. Similar banks should be constructed to prevent any liquids escaping from the burial site. Fencing may be necessary to exclude animals until the site is safe for use. <p>Gas production from decomposition within unopened carcasses may result in considerable expansion in the volume of the buried material to the extent that the surface of the closed pit may rise and carcasses may be expelled from the pit. It is recommended that large animal carcasses be opened by slashing the rumen of cattle or the caeca of horses to permit escape of gas. There appears to be little benefit in opening small animal carcasses.</p> <p>Lime may be added to pits to prevent earthworms bringing contaminated material to the surface after pit closure. The carcasses must be completely covered with soil, and an unbroken layer of slaked lime [Ca (OH)₂] should be added before filling is completed. Lime should not be placed directly on carcasses because it slows, and may prevent, decomposition.</p> |
| <p>Other Potential Methodologies</p> | <p><u>Fermentation</u></p> <p>The process of lactic acid fermentation is simple and requires little equipment – the process needs only a tank and a grinder. Fermentation is an anaerobic process that can proceed in any sized non-corrosive container provided it is sealed and vented for carbon dioxide release. During this process, carcasses can be decontaminated and there is a possibility of recycling the final products into feedstuff. Fermentation products can be stored until they are transported to a disposal site.</p> <p>Carcasses are ground to fine particles, mixed with a fermentable</p> |

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| | <p>carbohydrate source and culture inoculant, and then added to a fermentation container. Grinding aids in homogenizing the ingredients. For lactic acid fermentation, lactose, glucose, sucrose, whey, whey permeates, and molasses are all suitable carbohydrate sources. The carbohydrate source is fermented to lactic acid by <i>Lactobacillus acidophilus</i>.</p> <p>Under optimal conditions, including a fermentation temperature of about 35°C, the pH of fresh carcasses is reduced to less than 4.5 within two days. Fermentation with <i>L. acidophilus</i> destroys many bacteria. There may be some micro-organisms that can survive lactic acid fermentation, but these can be destroyed by heat treatment through rendering.</p> <p><u>Gasification and Incineration</u></p> <p>A thermal process in which organic carbonaceous materials are incinerated under limited oxygen conditions in a primary chamber utilizing syngas and charcoal. In most systems the syngas and char will be oxidized through a secondary chamber at a higher temperature, leaving 1-3% ash. Surplus syngas from the primary chamber is cleaned and utilized as a fuel.</p> <p><u>Alkaline Hydrolysis</u></p> <p>Alkaline hydrolysis uses sodium hydroxide or potassium hydroxide to catalyze the hydrolysis of biological material (protein, nucleic acids, carbohydrates, lipids, etc.) into a sterile aqueous solution consisting of small peptides, amino acids, sugars and soaps. Heat is also applied to significantly accelerate the process. The only solid byproducts of alkaline hydrolysis are the mineral constituents of the bones and teeth of vertebrates. This undigested residue, which typically constitutes approximately two percent of the original weight and volume of carcass material, is sterile and easily crushed into a powder that may be used as a soil additive.</p> <p>Alkaline hydrolysis is carried out in a tissue digester that consists of an insulated, steam-jacketed, stainless-steel pressure vessel with a lid that is manually or automatically clamped. The vessel contains a retainer basket for bone remnants and other materials. The vessel is operated at up to 70 psig to achieve a processing temperature of 150°C. The process releases no emissions into the atmosphere and results in only minor odour production. The end product is a sterile, coffee coloured, alkaline solution with a soap-like odour.</p> <p><u>Thermal Hydrolysis</u></p> <p>Thermal hydrolysis refers to a process in which biological material is treated with high-temperature high pressure steam. It blasts steam at material in specialized vessels at high temperatures for 30 minutes or longer in order to destroy the cell walls. The process destroys a wide range of pathogens, has a low odour and is normally completed within six hours.</p> |
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Annex C Specialized Equipment List

This list provides guidance for specific disposal methodologies. It is not intended to provide a complete inventory of equipment/resources required for every foreseeable situation – each disposal emergency will have its own detailed needs. The list does, however, provide a basis for planning and a starting point for the allocation and deployment of resources.

| Disposal Methodology | Resources Required |
|----------------------|--|
| Burial | <p>For burial, the preferred equipment for digging burial pits is an excavator. This equipment is the most efficient available for the construction of long, deep, vertically sided pits. Other advantages include the ability to easily store topsoil separate from subsoil and the equipment can be used if required to fill the pit with carcasses or other materials and closing the pit without disturbing the carcasses.</p> <p>Carcass conveyance such as a tractor with front-end loader. Tow chain. Disposal bins. Vans or other vehicles for personnel transport. Vehicles approved for transporting hazardous material. Bags if required for transport of carcasses (poultry). Poly sheeting and tarpaulins. Disinfectant. Protective clothing.</p> |
| Burning | <p>Backhoe with front-end loader. Digging tools. Vans or other vehicles for personnel transport. Vehicles approved for transporting hazardous material. Bags if required for transport of carcasses (poultry). Poly sheeting and tarpaulins with anchors. Disinfectant. Protective clothing. Suitable fuel for pyres. Preferred: air curtain burners.</p> |
| Rendering | <p>Vehicles suitable for transporting hazardous material. Poly sheeting and tarpaulins with anchors. Bags if required for transport of carcasses (poultry). Front-end loader. Tow chain. Vans or other vehicles for personnel. Disinfectant. Protective clothing.</p> |
| Composting | <p>Midsized front-end or skid-steer loader. Hand tools. Composting thermometers. Carbon source (litter, sawdust, etc).</p> |

| | |
|----------------------------|---|
| | <p>Moisture meter. Water hose and supply. Warning signs. Poly sheeting and tarpaulins with anchors. Cleaning and disinfectant supplies.</p> |
| <p>Incineration</p> | <p>Vehicles suitable for transporting hazardous material. Poly sheeting and tarpaulins. Front-end loader. Tow chain. Incineration equipment suitable for the carcass type(s) being disposed of. Vans or other vehicles for personnel. Protective clothing.</p> |
| <p>Fermentation</p> | <p>Containers:</p> <ul style="list-style-type: none"> - Garbage cans (2 per unit) for less than six bovine units. - Large metal bins from renderer or large garbage bins for 6-60 bovine units. - Above-ground horizontal silo or trench silo or a liquid manure tank for more than 100 bovine units. <p>Plastic film to cover containers. Front-end loaders. Grinder capable of reducing carcasses to 2cm cubes. Mixer capable of mixing animal tissue, water and culture. Lactobacillus culture. Carbohydrate source, such as processed animal feed or high starch vegetable waste.</p> |

Annex D Training Requirements

All personnel involved with carcass disposal operations need training, particularly with respect to safety, health and environmental requirements. This includes all Chilliwack emergency and support staff, associated emergency personnel from FVRD and, where possible, representatives from the local farming industry.

To ensure the validity of operational plans and the effectiveness of training, a carcass disposal exercise should be conducted once annually. The exercises can take one of the following forms, working incrementally from the simplest (Level 1) to more complicated methods.

| Level | Type/Format | Structure |
|-------|-----------------------------------|--|
| 1 | Orientation (Discussion-based) | The orientation exercise is conducted at an introductory level to familiarize participants with roles, plans, procedures or equipment. It is presented as an informal discussion in a group setting with little or no simulation. A variety of seminar formats can be used, including lecture, discussion, slide or video presentation, computer demonstration or panel discussion. |
| 2 | Tabletop (Discussion-based) | A tabletop exercise is a facilitated analysis of an emergency situation in an informal, low-stress environment. It is designed to elicit constructive discussion as participants examine and resolve problems based on existing operational plans. Tabletop exercises lend themselves to broad discussion of policies and procedures, provide an opportunity for participating organizations and staffs to become acquainted with one another and are good preparation for more complex exercises. |
| 3 | Drill (Operations-based) | A drill is a coordinated, supervised exercise activity normally used to test a single specific operation or function. With a drill, there is no attempt to coordinate organizations or fully activate an EOC. Its role is to practice and perfect one clearly defined part of a response plan and to help prepare for more extensive exercises. |
| 4 | Functional (Operations-based) | A functional exercise is a simulated, interactive exercise that tests the capability of an organization to respond to a simulated event. This is a moderate-to-high stress activity which simulates an incident in the most realistic manner possible short of moving resources to a field site. A functional exercise is always a prerequisite to a full-scale exercise. |
| 5 | Full-Scale (Operations-based) | A full-scale exercise simulates a real event as closely as possible. It is an exercise designed to evaluate the operational capability of emergency management systems in a stressful environment that simulates actual response conditions and requires the mobilization and actual movement of emergency personnel, equipment, and resources. |