

# Canadian Quality Milk On-Farm Food Safety Program

Best Management Practices  
Critical Control Points  
Standard Operating Procedures  
Corrective Actions

## Reference Manual



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada

Canada

Dairy Farmers  
of Canada



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### **Technical Committee**

Alex Hamilton\*  
Annette Moore\*<sup>†</sup>  
Carl Esau<sup>†</sup>  
Deb Haupstein\*<sup>†</sup>  
Don Anderson<sup>†</sup>  
Marie Skerritt<sup>†</sup>  
Nicole Sillett\*<sup>†</sup>  
Paul Norris<sup>†</sup>  
Pierre Lévesque\*<sup>†</sup>  
Rob Tremblay, DVM\*<sup>†</sup>  
Ron Sampson\*<sup>†</sup>  
Susan Robinson<sup>†</sup>  
Ted Taylor<sup>†</sup>

\*Technical Committee members for 2009 version

<sup>†</sup>Technical Committee members for 2003 version

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### **Disclaimer**

This publication reflects the opinions of the contributing writers and editors and is based on information available as of the publication date. It may not reflect the programs and policies of the supporting agencies. References to particular products should not be regarded as an endorsement.

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## PRESIDENT'S MESSAGE



Welcome to the Canadian Quality Milk (CQM) program.

In 1997, Canadian dairy farmers agreed to demonstrate to consumers that they are doing their absolute best to ensure safe dairy products and beef on consumers' tables. The Canadian Quality Milk program was developed by Dairy Farmers of Canada and approved by the Canadian Food Inspection Agency. Today, farmers are proudly implementing the CQM program on farms across the country.

The CQM program is an on-farm food safety program that outlines the ways in which producers can best maintain the safety of milk and meat through risk prevention on the farm.

The program has been designed by dairy producers for dairy producers. It is a practical program that provides us with peace of mind that we are doing a great job of producing safe, quality food. We have been doing an excellent job for years, and this program further enables us to prove it.

Our program is an international leader and we will continue to strive to be the very best. We want to produce the best, safest, most environmentally friendly dairy products in the world. I encourage every dairy producer to embrace and implement the program, further demonstrating our commitment to excellence.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Jacques M. Laforge'. The signature is fluid and cursive, with the first name 'Jacques' and last name 'Laforge' clearly distinguishable.

Jacques Laforge  
President, Dairy Farmers of Canada

# INTRODUCTION



The Canadian Quality Milk Program (CQM) is an on-farm HACCP-based food safety program developed by Dairy Farmers of Canada. The CQM program is designed to maintain milk and meat safety on dairy farms through improved management practices, increased communication and effective record keeping.

The key concepts discussed in the Reference Manual are:

- **Hazard Analysis Critical Control Point (HACCP) approach**
- **Best Management Practices (BMPs)**
- **Critical Control Points (CCPs)**
- **Standard Operating Procedures (SOPs)**
- **Corrective Actions**

Dairy producers are in the business of producing food. They aim to ensure that the safety, flavour and quality of their milk and meat will satisfy the highest expectations of the food industry and consumers alike.

Food safety is everyone's business in the dairy industry. Milk quality and safety is checked after the producer harvests the milk, before the bulk tank milk graders pick the milk up and before milk is unloaded at the processor. Dairy steers, young stock and cull cows' carcasses are graded and inspected for safety. Only safe meat is used for human consumption. Results that fall outside standards lead to warnings, rejection of milk or meat, penalties and loss of market access.

End product testing for milk and meat are reasonably effective detectors of food safety and quality problems; however, by that point, the defects have already occurred and a dollar loss sustained. On-farm food safety programs strive to help producers use control measures at strategic points during production to prevent, control and reduce problems. For example, any substances being used in or on a cow or in the cow's environment should have been assessed as a potential food safety risk by an appropriate regulatory authority.

### ABOUT THIS BOOK

This book is intended to help producers implement best management practices and a HACCP-based program on their farms.

The book is organised into chapters that focus on the production components, inputs, outputs and processes of dairy operations. It covers areas such as the animals' environment, feed, animal health, milking procedures and water.

Most chapters contain:

- Descriptions of best management practices.
- Management tools and processes.
- Troubleshooting keys and corrective actions.
- Cross-referencing to other chapters and resource material.
- A list of the potential hazards.



**Shaded sections within this manual identify areas where compliance is mandatory for the successful implementation and validation of the Canadian Quality Milk program: a HACCP-based, on-farm food safety program.**

To be a registered Canadian Quality Milk (CQM) farm, the farm or producer must meet the following criteria:

- Be currently licensed to ship milk by the provincial regulatory authority.
- Meet the minimum acceptable standards set out in the Dairy Regulations of that province, as well as any pertinent federal regulations (e.g. feed regulations).
- Monitor the Critical Control Points through the use of permanent records.
- Implement the mandatory Best Management Practices.
- Write Standard Operating Procedures and keep them current.
- Maintain other records.

Un-shaded sections within this manual identify areas that are recommended to reduce food safety risks.

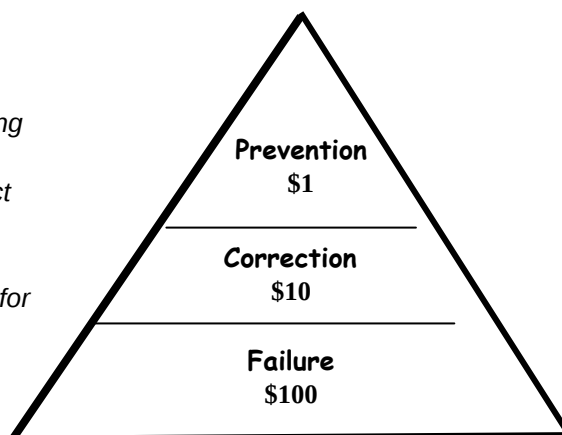
**This book is the Reference Manual for the Canadian Quality Milk Program Workbook and the associated requirements.**

## HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP) APPROACH

A Hazard Analysis Critical Control Point Analysis (HACCP)-like approach is a systematic, science-based method of identifying and assessing food safety hazards in an operation and then developing steps to prevent, control and reduce those risks to acceptable levels.

*Advantages of a HACCP-based program are:*

- *A consistent supply of safe milk and meat to processors and consumers.*
- *Prevention of problems, which is cheaper than solving problems.*
- *Reduced penalties and less raw and finished product wastage.*
- *Increased industry and consumer confidence.*
- *Better mechanism to respond to consumer demand for food safety.*
- *Increased producer and processor milk and meat production efficiencies and improvements.*
- *Better control over management = lower production costs = higher producer profits.*
- *Standardization of daily routines.*
- *Improved herd health.*
- *Reduced environmental impact.*
- *Increased producer gains from quality incentive payments (where applicable).*
- *Increased competitive edge over competitors (within milk and beverage industries).*
- *Food safety assurance for export trade.*



**Figure 1: Prevention Savings**

**\$1 spent on prevention will save \$10 on product correction and \$100 to deal with product failure.**

**HACCP** refers to the systematic process of:

- Identifying **hazards** to food safety.
- Specifying **Critical Control Points** in the production process where control measures are essential.
- Implementing and documenting **Best Management Practices** to prevent problems.
- Setting **critical limits** to ensure each CCP is under control.
- Setting-up **monitoring procedures** for each CCP.
- Using **troubleshooting** procedures and **corrective actions** to eliminate or reduce food safety problems.
- Setting-up **verification procedures** to prove that the control program is working.
- Developing a **record-keeping** system to monitor the effectiveness of the HACCP system which uses Best Management Practices.



**Hazards** are risks to food safety. Hazards are chemical, biological or physical in nature, for example:

- **Chemical** — livestock medicine, pesticide residues, cleaning compound residues, and contaminated feeds.
- **Biological** — harmful bacteria, parasites and other disease-causing organisms.
- **Physical** — sediment, dust, flies, hair, glass, 'black specks' in milk and broken needles in meat.

**Typical hazards are identified in this book.**

The Canadian Quality Milk program is HACCP-based because it is difficult to achieve full control of hazards on a farm: a farm is an open system, not a closed system like a processing plant. HACCP-based programs apply the principles of HACCP where applicable and practical on a farm. Furthermore, a HACCP-based program does not guarantee that the end-product will be 100 percent safe. A HACCP-based program focuses on improving food safety management and addressing the process to reduce food safety risks.

## BEST MANAGEMENT PRACTICES

**Best Management Practices** (BMPs) are recommended and proven management procedures that help prevent on-farm food safety problems from occurring. They are the foundation of any HACCP program and are very important to an on-farm food safety program.

The CQM program has grouped Best Management Practices into eight sections:

**BMP1:** Dairy facilities, pesticides and nutrient management

**BMP2:** Feed

**BMP3:** Animal health and biosecurity

**BMP4:** Medicines and chemicals used on livestock

**BMP5:** Milking management

**BMP6:** Facility and equipment sanitation

**BMP7:** Use of water for cleaning milk contact surfaces

**BMP8:** Staff training and communication

## CRITICAL CONTROL POINTS

A **Critical Control Point (CCP)** is a point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to an acceptable level. Neglect or error in observing these points or practices could lead to **irreversible** problems with the end food product. The CQM program requires dairy producers to monitor the Critical Control Points:

**CCP1:** Milking treated animals

**CCP2:** Cooling & storage of milk

**CCP3:** Shipping animals

**Table 1: Critical Control Points, Hazards and Critical Limits**

| CCP #                                              | Hazard                                                               | Critical Limit                                                                                                                                                                                                                               |
|----------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CCP1:</b><br><b>Milking Treated Animals</b>     | Chemical: <i>Pharmaceuticals</i>                                     | Negative by a recognized test by the provincial regulatory authority                                                                                                                                                                         |
| <b>CCP2:</b><br><b>Cooling and Storage of Milk</b> | Biological: <i>Pathogenic bacteria</i>                               | 1 <sup>st</sup> milking: greater than 0°C and less than or equal to 4°C within two hours after milking<br>Subsequent milkings: temperature never above 10°C and greater than 0°C and less than or equal to 4°C within one hour after milking |
| <b>CCP3:</b><br><b>Shipping Animals</b>            | Chemical:<br><i>Pharmaceuticals, pesticides, biological products</i> | Negative by a recognized test by the federal or a provincial regulatory authority or information is communicated to the next buyer                                                                                                           |
|                                                    | Physical:<br><i>Broken needles</i>                                   | Zero tolerance or information is communicated to the next buyer                                                                                                                                                                              |

The irreversible damage that can be done to milk or meat if the CCPs are neglected can take several forms:

- Antibiotics in the raw milk or meat cannot be removed.
- Milk may have a high bacteria count if it is not properly cooled or stored.
- Broken needles in meat damage the meat and pose a human health risk.

None of these situations can be 'fixed' once the hazard has occurred; therefore, HACCP-based prevention programs are essential.

If a problem occurs at a CCP, a HACCP-based system requires corrective action plans to be in place to correct the problem. Troubleshooting charts are in Chapter 11.

## STANDARD OPERATING PROCEDURES

Safe food can be produced on a continuous basis if every person involved works consistently. Best Management Practices are the foundation of an on-farm food safety

program and establishing **Standard Operating Procedures (SOPs)** is the first step in applying BMPs in a consistent manner. SOPs are written procedures that describe step-by-step how an activity, such as milking, should be carried out. Consistency with a repetitive task, such as milking, is necessary to produce safe milk, and to produce it efficiently. Furthermore, if something goes wrong, the SOP can be re-evaluated to determine if it can be improved to prevent the problem from re-occurring.

Standard operating procedures, for example, can help producers and their staff to:

- Know which animals produce milk that cannot go into the bulk tank - to prevent contamination of milk in the bulk tank.
- Apply the same milking routine with each milking - essential to obtain good milking performance.

SOPs need to be accessible and regularly updated. Employees need to be trained and evaluated on a regular basis to ensure consistency. Samples of some standard SOPs can be found throughout the reference manual. .

## CORRECTIVE ACTIONS

**Corrective Action Plans** outline the steps family and staff should take to correct a problem if a problem occurs at a CCP and some BMPs (BMPs 4, 6 and 7). Corrective Action Plans should contain detailed instructions and contact numbers.

If a problem or deviation occurs at a CCP or some BMPs (BMPs 4, 6 and 7), the CQM program requires corrective actions to be carried out to correct the problem. The program also requires that each deviation and chosen corrective action be documented.

Many of the sample records in the Workbook have a place for deviations and corrective actions to be recorded and a separate sheet is provided as well.

## MAKING HACCP WORK

Implementing CQM, a HACCP-based program, on a dairy farm requires:

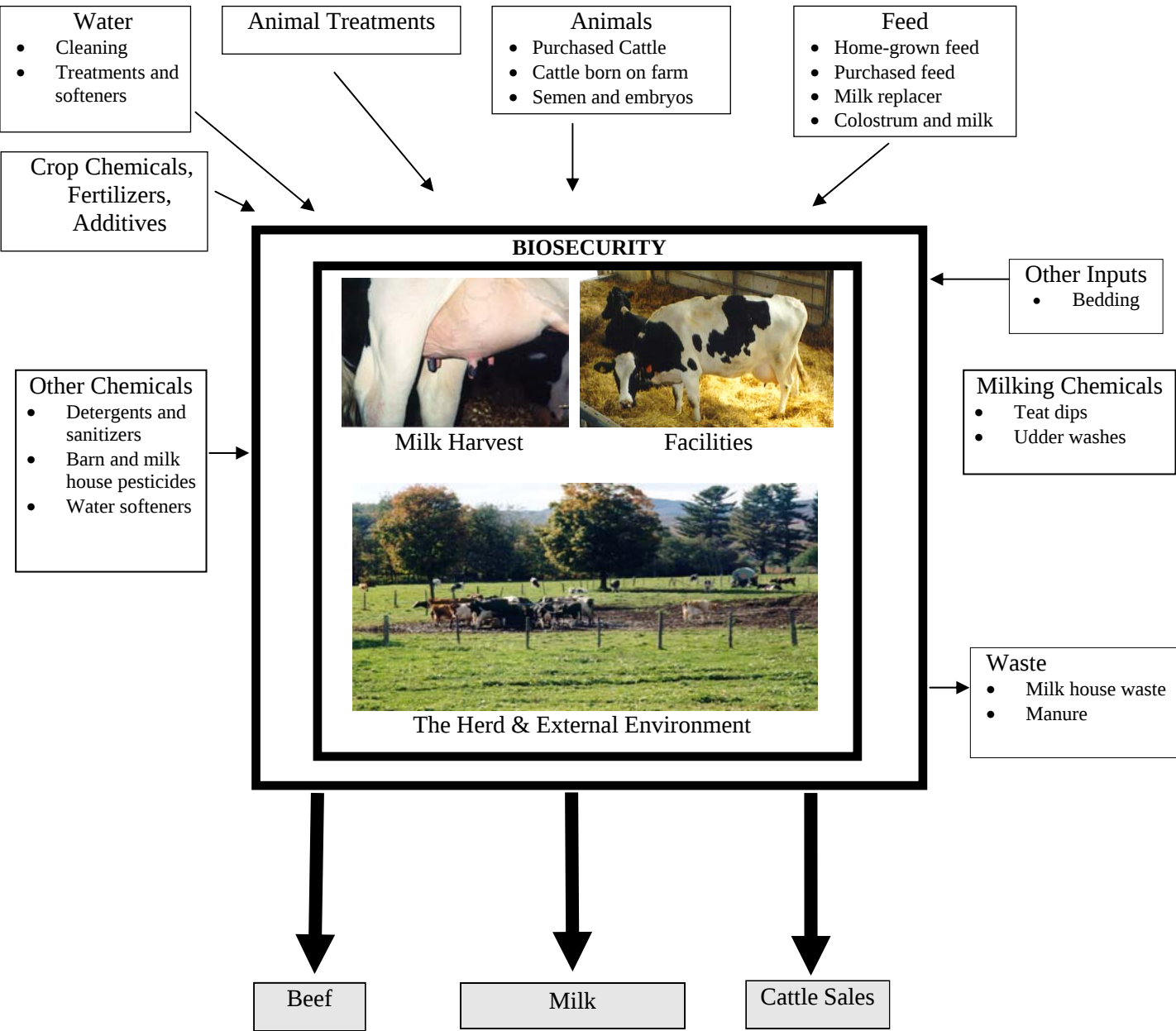
- An honest, critical analysis of the operation.
- An assessment of hazards and CCPs in the production system.
- A practical and reliable record-keeping system.
- Time to assess the best management practices, corrective measures and alternatives.
- A training program for family members and staff.
- An ongoing commitment to food safety and continuous improvement.



**Consumers Always Have the Last Word  
On Food Safety.**

FLOW CHART

The flow chart highlights the inputs and outputs for the production of milk and meat.



## 1.0 DAIRY FACILITIES, PESTICIDES AND NUTRIENT MANAGEMENT (BMP 1)

### Index:

|                                                  |
|--------------------------------------------------|
| Regulatory Requirements                          |
| Pesticides and Chemicals                         |
| Nutrient Management                              |
| Treated Wood in Cattle Environments              |
| Purchased Inputs                                 |
| Pest Control                                     |
| Summary of Hazards and Best Management Practices |



## Workbook Self-Evaluation Questions

### BMP 1 Dairy Facilities, Pesticides and Nutrient Management

Proper care of facilities, storage of chemicals, use of pesticides and nutrient management are important to the production of safe milk and meat.

| Reference Manual Chapter 1 |                                                                                                                                                                                                   |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regulatory Requirements    |                                                                                                                                                                                                   |
| 1.                         | <b>Licensed dairy farm:</b> Is your farm currently licensed to ship milk by the provincial regulatory authority?                                                                                  |
| Pesticides and Chemicals   |                                                                                                                                                                                                   |
| 2.                         | Do you <b>only</b> use pesticides registered for use in the: (Demerits)                                                                                                                           |
|                            | <ul style="list-style-type: none"> <li>• Milk house?</li> <li>• Barn?</li> <li>• Fields?</li> </ul>                                                                                               |
| 3.                         | Do you use registered pesticides according to the label and follow pre-harvest intervals to harvest or grazing? (Demerits)                                                                        |
| 4.                         | Do you store pesticides, treated seed and fertilizer in a safe and secure manner and according to provincial dairy regulations? ( <i>concerned with both cow &amp; milk exposure</i> ) (Demerits) |
| 5.                         | Is any hose connected to the milk house or barn water system used for filling pesticide sprayers or containers? <input type="checkbox"/> Yes <input type="checkbox"/> No                          |

## Reference Manual Chapter 1

If yes, do you have an anti-backflow device? (Demerits)

### Nutrient Management

**6.** Do your animal husbandry, manure and waste management systems ensure the cleanliness of lactating cattle's udders? (Demerits)

**7.** Do you restrict cattle access to manure storage or manure run-off? (Demerits)

**8.** At the time of milk pick-up, is the lane-way and loading area free of manure contamination? (Demerits)

**9.** **Do you use sewage sludge?** ☐ Yes ☐ No  
If yes, does your farm have the necessary approval/permits required to use sewage sludge? (Demerits)

### Treated Wood in Cattle Environments

**10.** Do you prevent exposure of cattle and cattle feed to treated lumber and bedding made from treated materials?

### Purchased Inputs

**11.** Do you ensure that all of your purchased inputs do not pose a risk to milk or meat (e.g. properly labeled, intact, unopened containers, HACCP-certified vendor)? Inputs include items such as fertilizers, animal treatments, pesticides, sewage sludge, bedding and milking chemicals.

### Pest Control

**12.** Do you have a pest control program to prevent contamination of feeds and premises by vermin, pets and wildlife?

# Introduction

Whether cattle are grazing in pastures, passing time in exercise yards, standing in the milking parlour or lying in their stalls, their environment can pose hazards if improperly managed. Exposure to chemicals, contaminated water sources, hazardous objects (e.g. discarded wire, boards with nails), manure and muddy areas can affect cattle health and, in turn, milk quality and safety.

The proper management of pesticides, animal manure and pests is important to the production of safe milk and meat. Livestock wastes include potentially harmful components: nitrates, phosphates, organic material and microbes (i.e., bacteria, viruses, protozoa and parasites). Improperly handled livestock waste can pollute water sources, cause diseases, and result in fly outbreaks.

The milk house is the final stop for quality control on the farm. Milk safety and quality can be affected by hazards such as insects and improperly stored cleaning, pest control and pharmaceutical products.

Best management practices for dairy operation facilities, from simple cleanliness to overall facility design, can minimize these hazards and keep livestock dry, comfortable, safe and healthy.

## 1.1 REGULATORY REQUIREMENTS

The Canadian Quality Milk program is not designed to replace or supercede regulations pertaining to food safety on dairy farms. As stated in the introduction of this manual, a farm/producer must be licensed to ship milk by the provincial regulatory authority. The farm/producer must also meet the minimum acceptable standards set out in the Dairy Regulations of that province that apply to food safety, as well as any food safety-related Federal regulations (e.g. feed regulations). As regulations are added or amended in a province, they will apply to the CQM program.

## 1.2 PESTICIDES AND CHEMICALS

Pesticide and chemical use on dairy farms must be properly controlled to ensure that milk and meat are not accidentally contaminated. Pesticides include chemicals used on crops or pastures, and in and around the milk house and barns.

### 1.2.1 Pesticide and Chemical Application

- ✓ **Only use registered pesticides.** All products used on pastures, crops, feeds and surrounding land or in farm buildings must be registered for use in Canada. This includes pesticides used to control rodents and flies.

- ✓ Manage **all** chemicals used on the farm, regardless of whether they are specific to dairy animals, in a manner that will avoid the accidental introduction of these products into the feed and, as a result, into milk and meat.
  - ✓ **Always follow label directions** when applying pesticides (e.g. herbicides, rat poison) to pastures, crops, surrounding land or in farm buildings.
    - Check labels for compatibility with lactating and meat animals, withdrawal requirements for milk and meat, and proper application rates of products to the conditions, plants and feeds being targeted.
    - Pay particular attention to 'Days Before Grazing' intervals before allowing animals access to pastures. Follow "Pre-harvesting Intervals" or "Days To Harvest" for forage fields.
    - Be aware of any cautions regarding toxicities to animals (e.g. rat poison).
    - Fly sprays and pesticides used in the milk house or milking parlour must be registered for use in those areas.
- Pesticide is the generic term used for any substance used to destroy an organism harmful to plants, animals, stored food, etc. More specific terms are herbicides (e.g. weeds), avicides (e.g. birds), insecticides (e.g. insects), and rodenticides (e.g. rodents).**
- ✓ Follow all recommended procedures for using, mixing and applying pesticides. Never mix and store any pesticides nor rinse or clean pesticide containers or equipment near dairy feed or milking facilities.
  - ✓ Beware of other factors when handling pesticides or chemicals:
    - Avoid over-spraying and spills.
    - Never use equipment or facilities meant for dairy use to mix chemicals or drug treatments — residues will remain on equipment or allow for cross-contamination through spills, air dispersal, back-siphoning effects, etc. Remember that water systems are often connected; therefore, contaminating water in one section of the farm may contaminate the entire water system.
  - ✓ Keep an inventory record of all pesticides used on the farm.
  - ✓ Check pasture for signs of pesticide drift when walking the fields by looking for herbicide injury symptoms on forage plants. If symptoms are present, investigate further before allowing animals to enter.
  - ✓ Ensure all individuals on the farm who work with pesticides:
    - Know where and how pesticides used on the farm should be mixed, used, stored, and disposed of.
    - Know how to dispose of empty pesticide containers.
    - Follow good hygiene practices after handling pesticides, chemicals and drugs.

### 1.2.2 Pesticide and Chemical Storage and Handling

Generally, dairy cattle are at risk of coming into contact with contaminants in areas where these products are stored and mixed. Improper storage and handling practices can cause spills and leaks or cross-contamination with feedstuffs. The following are some practices that will help minimize risk:

- ✓ Store pesticides, treated seed and fertilizers separately and in original containers in a location where there is no livestock access or risk of contaminating milk, and according to provincial dairy regulations.

- Crop or animal pesticides must not be stored in the milk house, unless registered for use in the milk house.
- Pesticides, cleaners and other substances that are not for use on or in cattle must not be stored with livestock medicines and chemicals. They must be stored separately (e.g. another cupboard or different shelves). Pesticides should pose no risk of contaminating feed, milking equipment or products used on milk contact surfaces.
- Access to the storage area must not be through the milking parlour or milk house because, if it was, a spill during transport could contaminate the parlour/milk house equipment resulting in a food safety hazard. If there are no other options, producers must be able to show how they can safely transport those products or they must re-locate them.



- ✓ **Handle pesticides, treated seed, and fertilizers properly.**

- If any hose connected to the milk house or barn water system is used to fill pesticide sprayers or containers, use an anti-backflow device or air-gap on the hose to effectively prevent back-siphoning; hence, contamination of lines or cisterns.
- Never mix any pesticides, treated seed or fertilizers near dairy feed or milking facilities. Do so only in a properly designed storage or handling facility.
- Never clean or rinse any equipment related to the use of pesticides, treated seeds or fertilizers near dairy feed or milking facilities.
- Dispose of containers properly. Triple rinse to flush remaining pesticide. Bring empty and rinsed containers to designated disposal areas.
- Follow proper spill clean-up procedures. Check product Material Safety Data Sheets (MSDS) for specific instructions.

***For further information contact your provincial or regional authority on pesticides.***

## 1.3 NUTRIENT MANAGEMENT

### 1.3.1 Cattle Environment

#### 1.3.1.1 Housing

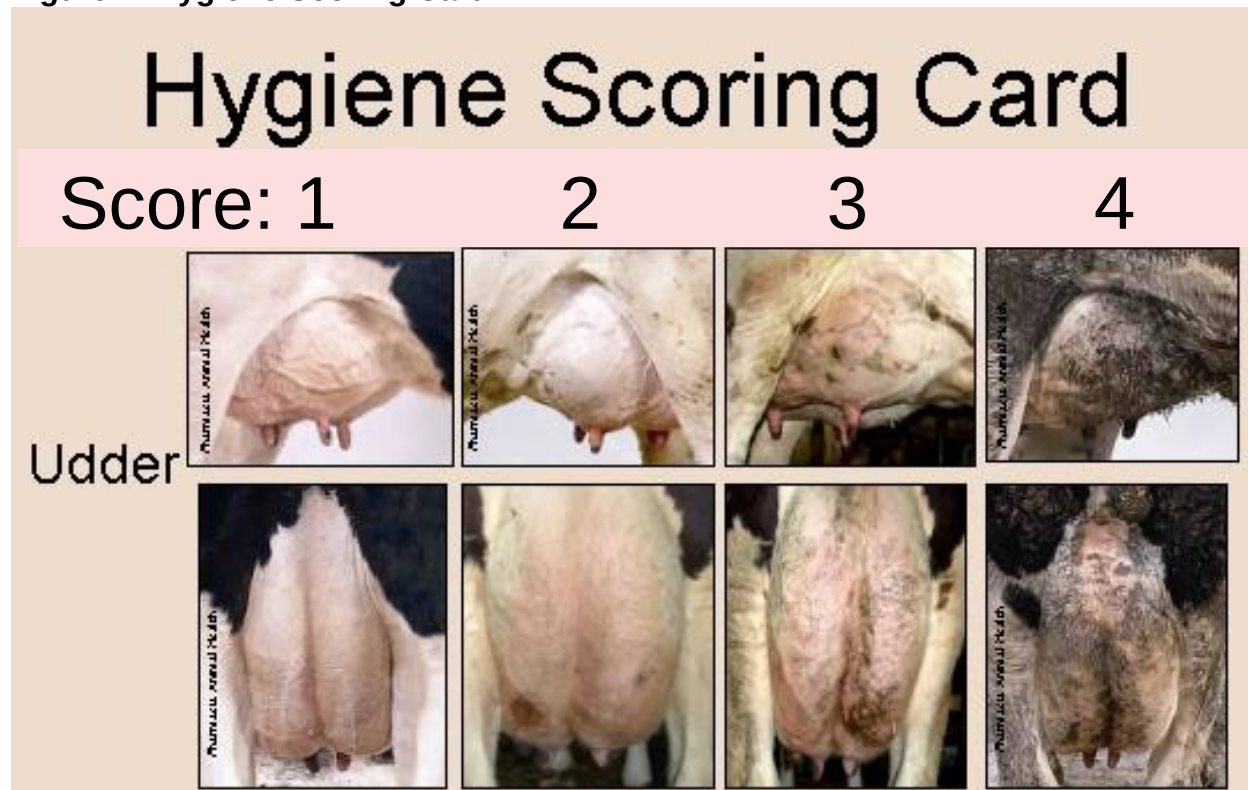
The goal of dairy cattle housing is to provide an environment that is clean, dry, comfortable and safe. A clean environment will help reduce hazards to milk safety that are related to dirty udders (e.g. bacteria).

Cattle housing must be designed and maintained to ensure the cleanliness



of lactating cattle's udders. Ideally, all cattle in the herd should score at 1 or 2. Over 20% of the herd scoring 3 or 4 is unacceptable. At least 25% of the herd has to be scored to support compliance. Please refer to the score card in Figure 2.

Figure 2: Hygiene Scoring Card



Source: *Less Mastitis, Better Milk* from Institut de technologie agroalimentaire, Québec and Pfizer Animal Health

The following best management practices describe some methods to help keep lactating cattle clean:

- ✓ Design stall area for cattle safety, cleanliness, maximum comfort and space for movement.
  - Ensure proper slope (recommended minimum 2-3%) for surface drainage.
  - Construct curb heights (20-30 cm or 8-12 inches) to keep manure, scrapings, and flush water out and to minimize udder damage.
  - Design stalls to provide enough lunge space in front of the cattle so they can get up and down naturally. If they cannot lunge forward naturally, they may lunge diagonally, increasing stall dirtiness.
    - In free stalls, mounting loops on posts eliminates horizontal mounting pipes in the “bob” zone of cattle.
    - In tie stalls, a higher head rail and a longer chain allow cattle to get up and down naturally and to rest in their favorite position.
  - Stall width and length and neck rail position are a compromise between cow comfort and stall cleanliness.

- In tie-stalls, install the water bowl over the manger to prevent overflow on the bedding.
- ✓ Maintain stalls:
  - Keep stalls clean, dry and drainable.
  - Clean stalls at least 2 times a day and rake as required to maximize cow cleanliness, comfort and use.
  - Regardless of whether the stall surfaces are concrete, rubber mats or mattresses, keep them covered with a layer of fresh bedding.
- ✓ Ensure stall bedding materials are absorbent, comfortable and do not encourage bacterial growth. Two choices of bedding materials are:
  - Organic (e.g. sawdust, shavings, straw, earth).
  - Inorganic (e.g. sand, gravel, quarry or limestone dust).
- ✓ Limit access to manure-cleaning equipment.

**Test it:** To test stall comfort, kneel down where your cattle have to lie. Rock back and forth; the surface should be comfortable and cushion your knees. If it hurts your knees to fall on this surface, your cattle will be reluctant to use this area. If after 10 to 20 seconds your knees are wet or dirty, udders will get dirty as well. In both cases, bedding management should be improved.

All cattle should be kept clean to reduce hazards associated with meat safety due to manure accumulations on hides when the animals are shipped. The best management practices described above also apply to keeping animals' hides clean.

### 1.3.1.2 Exercise Yards and Dry lots

Exercise yards and dry lots are areas that can be a source of manure-based bacteria.

- ✓ Restrict cattle access to manure and runoff storage by fencing cattle out of these areas.
- ✓ Design exercise yards for animal safety and cleanliness. Consider paved or mud-control materials where yards are perpetually wet and where traffic is heavy.
- ✓ Divert clean water (uncontaminated), such as water from rain, snow, snowmelt, roofs and eaves before it comes in contact with manure on exercise yard.
- ✓ Contain contaminated runoff by channeling it (e.g. from stored manure) to liquid manure storages or to artificial wetlands.
- ✓ Keep paved areas clean by regularly removing manure to manure storage area.
- ✓ Maintain forage cover in grassed exercise yards by managing the lot using a rotational grazing management system.

### 1.3.1.3 Laneways

- ✓ Ensure laneway and loading area for milk pick-up are free of manure contamination, at the time of milk pick-up.

- Limit cattle access to lanes used by off-farm transport vehicles. Cattle should not have unlimited access to the portion of the yard and lane travelled by the milk or feed transporters. Manure accumulations on farm yards or lanes are considered to be a possible source of contamination because of the soil and manure that adheres to the underside of the trucks and truck tires. There is increasing pressure within the industry to minimize the spread of pathogens from farm to farm and from farms to processing plants.
- ✓ Construct and maintain proper lanes and traffic areas to prevent environmental mastitis and maintain clean udders.
- ✓ Reinforce lanes closest to the barn.
  - For example, excavate the top 35 cm, line the area with geotextile fabric, backfill with stone and cover with lime dust to bind the stone.
  - **Never** use gravel-size stone on the surface of a laneway, as it causes stone (hoof) bruising.
- ✓ Locate water troughs in areas that minimize traffic and mud problems (water troughs in lanes can make moving cattle difficult).

### 1.3.1.4 Pastures

The goal of good pasture management is to balance cattle needs with pasture quality and availability, while reducing the risk of biological hazards (e.g. bacteria in manure) to raw milk and meat.

- ✓ Assess stocking rates and reduce grazing intensity when necessary, by assessing pasture quality, supply and manure accumulation.
- ✓ Manage access where necessary with:
  - Gradual grazing — cattle pastured for small periods initially.
  - Rotational grazing — sequential intensive grazing of subdivided pasture.
  - Forward grazing — allowing lactating animals to graze high-quality forage, followed by other cattle to graze down to desired levels.
- ✓ Manage high traffic areas by:
  - Using one of the grazing systems described above to reduce muddy areas.
  - Restricting access to muddy and manure covered areas because mud can develop in shady areas and can be a source of infectious diseases (e.g. environmental mastitis).
  - Removing debris (such as old fencing, equipment, concrete slabs, sharp stones and glass) that poses a risk of udder/body injury and evaluate animal access to debris and alternate storage areas.
  - Managing shaded areas, e.g., shade provides some relief from heat and biting flies, but the shaded area can become excessively trampled and manure-laden, which can lead to environmental mastitis. Two possible solutions are to:



- Allow animals back to the barn during very hot weather or provide a mister — if artificial shade is provided, it should be built to allow for good air flow.
  - Design the grazing system to allow fields/paddocks with shaded areas to be rested when shade is not essential.
- ✓ Restrict cattle access to surface waters and other natural areas.
    - Check herd health records for environmental diseases.
    - Check natural areas for excessive erosion and compaction.
    - Consider permanent fencing and alternate watering devices for frequently used areas.
    - Consider temporary barriers (e.g., electric fencing, or controlled access) for less heavily used areas.
  - ✓ Provide alternative watering devices.
    - Provide clean water supply from nearby or other water sources for heavily used areas.
    - Supply water using nose pumps, gravity-fed springs, solar pumps, or external power sources.
    - Inspect alternate water sources to ensure proper functioning and sanitation.
    - Use gravel or other wear-resistant surfaces near watering area to improve sanitation.
    - Use proper base and resilient surface materials to ensure adequate drainage around watering areas.

### 1.3.2 Manure Storage and Handling

- ✓ **Restrict cattle access to manure storage.** Reduce the risk of disease transmission by preventing cattle access to the manure storage. Cattle must also be prevented from coming in contact with runoff from the manure storage or cattle yards. Microbes that are present in manure cause many diseases. The *E.coli* (*Escherichia coli*) organism, for example, commonly found in bedding and manure, can be transmitted if cows' teats contact manure. This can lead to mastitis and other diseases, as well as contamination of the milk. Contamination of hides with manure also increases the risk of spreading *E.Coli* in the processing plant when cattle are slaughtered for meat
- ✓ **Select an appropriate manure management system.** Manure must be regularly removed from cattle housing and feeding facilities to prevent the spread of disease, maintain good health and keep cattle clean. The system should prevent cattle access to manure, reduce odour and fly infestation, and prevent the contamination of drinking water.
- ✓ **Ensure adequate size for dairy manure storage.** Manure storage facilities should be large enough to store manure, bedding, wasted feed and all liquids, including precipitation,

A manure management system has two main components: equipment to collect and transfer manure; and a storage facility where manure is held when it cannot be spread.

Check with your provincial or regional authority for the recommended or required storage.

for the periods between acceptable land application times. Inadequate storage may cause problems with cattle cleanliness.

### 1.3.3 Nutrient Application

Manure, whether applied as fertilizer or deposited by grazing cattle, is a source of bacteria, some of which are disease-causing organisms.

Clean water is a key element in ensuring a safe milk product because it is used to clean milking equipment. How you manage wastes may affect water quality. If improperly handled, livestock wastes can pollute surface water and groundwater. This can affect not only the existing livestock operation, but also other operations and residences downstream or on the same aquifer (or system).

- ✓ Some BMPs for applying nutrients for cropland and pastures are the following:
  - Ensure there is enough land to spread all of the stored manure and milk house wastes.
  - Apply nutrients in quantities that crops can use.
  - Apply manure when crops can use it (during growing season).
  - To reduce the risk of run-off and to help protect water sources, do not spread manure on frozen ground.
  - Pre-till land before applying liquid manure on tile drained land.
  - Incorporate manure as soon as possible following application.
  - Do not apply manure too close to wells, ponds and watercourses.
  - Distribute manure evenly over pasture by harrowing after each grazing cycle
  - Monitor tile outlets for effluent immediately following application on tile drained land.
- ✓ **Avoid contamination of feed with pathogenic bacteria.** Pathogenic contamination of feed is usually caused by fouling of feed with manure. Such diseases as *Salmonella* and *Neospora* can be linked to manure-contaminated feed. Some practices that help avoid feed contamination are:
  - If sewage sludge is used, following **stated/approved /permitted** application and withdrawal times for grazing or harvesting forage treated with sewage sludge (hazards include pathogens and heavy metals).
  - Ensuring feeding equipment (e.g. front-end loaders) is not contaminated with manure.
  - Avoiding standing or walking in feed bunks. In drive-through feed alleys, do not step on the feed itself.
  - Waiting appropriate time intervals before harvesting or pasturing after applying manure. There are a variety of factors to consider such as:
    - Volume of manure spread.
    - Weather.
    - Soil type.
    - Crop/forage.

- Designing a grazing system and following controlled grazing management to stop animals from causing excessive damage to the fields.
- Avoiding fouling of feed by vermin, pets or wildlife (e.g., birds, cats, dogs, coyotes, deer).

### 1.4 TREATED WOOD IN CATTLE ENVIRONMENTS

Treated wood can be toxic to animals if animals are allowed contact with it either through the skin or ingestion. While treated wood may be needed to construct some buildings and structures on a farm, some best management practices are:

- ✓ Avoid use of treated wood in areas where animals can access it or cover the treated wood with a safe covering.
- ✓ Avoid exposing cattle feed to treated lumber.
- ✓ Ensure bedding is not made from treated materials. Confirm with your bedding supplier if you are not certain.

### 1.5 PURCHASED INPUTS

The safety of all purchased products can have a significant impact on a farm. It is important to ensure that purchased products are safe and contain an unaltered product to avoid contamination of milk and meat. Inputs include items such as fertilizers, animal treatments, pesticides, sewage sludge, bedding, milking chemicals and teat disinfectants. Some best management practices are:

- ✓ Only purchase products from suppliers who use HACCP-based programs, and who offer a prescription, warranty or guarantee to the safety of those products for dairy animals or dairy farms.
- ✓ Purchase products that come in original, intact, unopened containers. For more information on pesticides, see Section 1.2 of this Chapter. For more information on livestock medicines and chemicals, see Chapter 4, Section 4.2.

### 1.6 PEST CONTROL

Insects, birds and vermin can introduce biological hazards into a dairy farm, so pest control programs should be developed and implemented. Some common best management practices are:

- ✓ Establish an insect and vermin control program.
- ✓ Keep all exterior doors, windows and openings in the milk house closed or fitted with screens to prevent entry of pests.

Limit access of birds to barns, feed and bedding storage areas. Bird droppings represent a general risk to sanitation and animal health. Birds can also carry and transmit specific diseases such as Salmonellosis.

- ✓ Ensure exterior milk house doors are tight-fitting and self-closing.
- ✓ Trap floor drains to prevent entry of odours, insects or rodents.
- ✓ Keep exterior of building clean and in good repair, and eliminate all potential fly breeding and feeding grounds.
- ✓ Prevent contamination of cattle feeds with feces from animals, including farm cats, dogs, deer and birds.
- ✓ Prevent access to rafters and ledges for perching birds by:
  - Using netting on the underside of rafters to discourage roosting and nesting.
  - Closing in roosting ledges or installing perch repellents (sharp wire or nails protruding from a solid base).
- ✓ Remove nests.
- ✓ Apply appropriate measures of insect control, (e.g. removal of any spilled grain, electronic fly killers provided, properly placed and maintained).



Houseflies do not directly affect the health of cattle, but they are a general sanitation concern. They can spread microbes such as bacteria and viruses during their feeding activity. Large numbers of adult flies are also a nuisance and indicate poor sanitation.

Houseflies reproduce by laying eggs in decaying organic matter such as manure, bedding and feed. The eggs develop into larvae, then into pupae. Pupae develop into adults to repeat the cycle. In warm summer weather, the life cycle can be completed within seven to 10 days. Starting control programs early in the season give the best results. To break the life cycle of the fly, follow the Best Management Practices outlined in Table 2.

**Table 2: Best Management Practices to Control House Flies**

| WHAT TO DO                          | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                         |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Removal of manure                   | <input type="checkbox"/> Clean alleyways, main congregation areas at least daily.<br><input type="checkbox"/> Clean barn corners and crevices at least every week during summer months.<br><input type="checkbox"/> Pay particular attention to calf bedding in pens and hutches. |
| Storage of manure, bedding and feed | <input type="checkbox"/> Store manure and feed away from the barn.<br><input type="checkbox"/> Keep bedding dry and under cover.<br><input type="checkbox"/> Compost or allow a crust to form.                                                                                    |

| WHAT TO DO                       | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eliminate breeding sites         | <input type="checkbox"/> Promptly remove spilled or spoiled feeds, particularly wet feeds like corn silage or haylage.<br><input type="checkbox"/> Cover silage.<br><input type="checkbox"/> Store baled straw and hay in a manner that ensures it remains dry.<br><input type="checkbox"/> Remove feed and silage weekly from feed bunks, around waterers, feed racks, and partially emptied feed storage areas.                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Implement biological fly control | <input type="checkbox"/> Use natural predators of larval and adult flies and other strategies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Place traps                      | <input type="checkbox"/> Control adult house flies by using mechanical and sticky traps. <ul style="list-style-type: none"> <li>• Place traps where flies have been seen to congregate.</li> <li>• Set out traps before the traditional fly season begins.</li> <li>• Check traps at least weekly and replace if needed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Use registered pesticides        | <input type="checkbox"/> Store pesticides in original containers and in a safe and secure manner that does not contaminate milk, feed or water.<br><input type="checkbox"/> Follow all label directions when using pesticides.<br><input type="checkbox"/> Use only registered pesticides.<br><input type="checkbox"/> When using insecticides, take special care to ensure the safety of animals and people on the farm, as well as the safety of food produced on the farm. Baits are insecticides combined with an attractant such as sugar, beer, molasses and insect hormones called pheromones.<br><input type="checkbox"/> Use in places where house flies have been seen to congregate.<br><input type="checkbox"/> Registered larvicides may be used to treat manure and other fly breeding sites to reduce the number of developing flies. |

## 1.7 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                              | SOURCE                                                                                                                                                                                                                                                                                   | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BIOLOGICAL</b>                   |                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Contamination of milk with bacteria | <ul style="list-style-type: none"> <li>• Manure and sewage sludge <ul style="list-style-type: none"> <li>- All environments</li> </ul> </li> <li>- Exercise yards</li> <li>- Traffic areas and laneways</li> <li>- Pasture areas</li> <li>- Stalls – design, base and bedding</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure animal husbandry, manure and waste management systems facilitate clean udders of lactating cattle.</li> <li><input type="checkbox"/> Restrict cattle access to manure storage, run-off areas, muddy areas and surface water.</li> <li><input type="checkbox"/> Ensure farm has the necessary approvals/permits required to use sewage sludge.</li> <li><input type="checkbox"/> Follow stated withdrawal times after application of sewage wastes.</li> <li><input type="checkbox"/> Follow withdrawal times after application of manure.</li> <li><input type="checkbox"/> Design exercise yards for animal safety and cleanliness.</li> <li><input type="checkbox"/> Divert clean water.</li> <li><input type="checkbox"/> Ensure laneways and milk loading areas are free of manure at time of milk pick-up.</li> <li><input type="checkbox"/> Install proper cattle crossings</li> <li><input type="checkbox"/> Construct and maintain proper lanes and traffic areas.</li> <li><input type="checkbox"/> Assess stocking rates and reduce grazing intensity where necessary.</li> <li><input type="checkbox"/> Evenly distribute manure.</li> <li><input type="checkbox"/> Design stalls for cattle safety, comfort and cleanliness.</li> <li><input type="checkbox"/> Use best available stall base.</li> <li><input type="checkbox"/> Use recommended stall bedding materials.</li> </ul> |
|                                     | <ul style="list-style-type: none"> <li>• Insects and vermin</li> </ul>                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Establish an insect and vermin control program.</li> <li><input type="checkbox"/> Keep all exterior doors, windows and openings closed or fitted with screens to prevent entry of pests.</li> <li><input type="checkbox"/> Ensure exterior doors are tight-fitting and self-closing.</li> <li><input type="checkbox"/> Trap floor drains to prevent entry of odours, insects or rodents.</li> <li><input type="checkbox"/> Keep exterior of building clean and in good repair, and eliminate all potential fly breeding and feeding grounds.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| HAZARD             | SOURCE                                                                                                                                                                                      | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHEMICAL           |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pesticides         | <ul style="list-style-type: none"> <li>Treated pasture or crops</li> <li>Milk house and barns</li> <li>Treated seed</li> <li>Backflow into hoses used to fill pesticide sprayers</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Use only pesticides registered for use in pastures, forages, milk houses and barns in those respective areas.</li> <li><input type="checkbox"/> Follow all pesticide label directions and watch for “Days to Grazing” or “Days to Harvest” warnings.</li> <li><input type="checkbox"/> Use an anti-backflow device on hoses connected to milk house and barn water supply.</li> <li><input type="checkbox"/> Maintain a valid, up-to-date pesticide safety certificate where required.</li> <li><input type="checkbox"/> Keep accurate records of pesticides used.</li> <li><input type="checkbox"/> Communicate effectively with family and staff at all times about residue hazards.</li> <li><input type="checkbox"/> Prevent cross-contamination of feeds.</li> <li><input type="checkbox"/> Use labs and test kits for suspected contaminants.</li> </ul> |
|                    | <ul style="list-style-type: none"> <li>Improper pesticide storage</li> </ul>                                                                                                                | <ul style="list-style-type: none"> <li><input type="checkbox"/> Store pesticides and treated seed in a safe and secure manner in original containers, away from livestock access, feed, feed storage and milking equipment.</li> <li><input type="checkbox"/> Store treated seeds separately from feed ingredients.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                    | <ul style="list-style-type: none"> <li>Spill or leak into pasture/exercise yard</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Follow proper spill cleanup procedures.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Fertilizers        | <ul style="list-style-type: none"> <li>Spilled bulk fertilizer</li> <li>Cross-contamination</li> <li>Mixing errors</li> </ul>                                                               | <ul style="list-style-type: none"> <li><input type="checkbox"/> Store fertilizers in a safe and secure manner in original containers, away from livestock access, feed storage and milking equipment.</li> <li><input type="checkbox"/> Clean-up spills.</li> <li><input type="checkbox"/> Apply fertilizer only at recommended rates.</li> <li><input type="checkbox"/> Calibrate application equipment.</li> <li><input type="checkbox"/> Harrow re-distributed fertilizer.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Wood preservatives | <ul style="list-style-type: none"> <li>Treated lumber</li> </ul>                                                                                                                            | <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not use treated lumber for feed bunk surfaces, stall bases, or platform of free stalls.</li> <li><input type="checkbox"/> Do not store feed in contact with treated lumber.</li> <li><input type="checkbox"/> Do not use bedding made from treated materials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 2.0 FEED (BMP 2)

### Index:

|                                                  |
|--------------------------------------------------|
| Medicated Feed                                   |
| Feeds and Feeding                                |
| Summary of Hazards and Best Management Practices |



### Workbook Self-Evaluation Questions:

#### BMP 2 Feed

A herd's health and productivity, along with the quality and safety of their milk and meat, depend on the quality and management of the feeds they are fed.

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reference Manual Chapter 2</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Medicated Feed</b>             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>13.</b>                        | <b>Do you use medicated feed?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No<br><b>If yes:</b> have you established and implemented a Standard Operating Procedure for feeding medicated feeds? (Record 7) (Demerits)                                                                                                                                                                                                                                            |
| <b>14.</b>                        | Do you receive medicated feeds with milk or meat withdrawals or that are prohibited for use in lactating cattle? <input type="checkbox"/> Yes <input type="checkbox"/> No<br>If yes, are feed bins and storage containers clearly marked for those who deliver the feed and for those that use it? (Demerits)                                                                                                                                                                  |
| <b>Feeds and Feeding</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>15.</b>                        | Do you have pet foods on your farm or feeds that are labeled not for use for ruminants (i.e. clearly labeled with the warning: Feeding this product to cattle, sheep, deer or other ruminants is illegal and is subject to fines or other punishment under the Health of Animals Act)? <input type="checkbox"/> Yes <input type="checkbox"/> No<br>If yes, do you store and handle those feeds to avoid feeding those feeds to cattle or cross-contaminating feeds for cattle? |
| <b>16.</b>                        | Do your feed manufacturer and/or feed supplier(s) have a recognized HACCP plan in place?                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>17.</b>                        | Do your feed facilities and feeding methods minimize the potential for cross-contamination (e.g. manure, medicated feeds)?                                                                                                                                                                                                                                                                                                                                                     |

## Introduction

An animal's health and productivity, along with the quality and safety of milk and meat, depend on the quality and management of feed.

### 2.1 MEDICATED FEED

If medicated feed is delivered or used on the farm, a few simple Best Management Practices will help ensure that animals do not accidentally become contaminated with drug residues.

Producers using medicated feeds must follow the same Best Management Practices for storage and administration that are required for other medications including following the label instructions and appropriate withdrawals for milk and/or meat. Remember that this includes all animals (e.g. calves). All medicated feeds must follow the Medicated Ingredient Brochure (developed from requirements set out in the Feeds Act), or be mixed according to a prescription from a licensed veterinarian. Medicated feeds must also be included on the List of Medicines and Chemicals Used for Livestock (Record 9).

Veterinary Natural Health Products (vNHPs) (e.g. homeopathic or natural remedy substances) are considered medications. The Best Management Practices for medicated feeds also apply to vNHPs used in cattle feed. See Chapter 4 for more information on vNHPs.

Producers that feed medicated feed to any group of animals must establish an SOP for feeding medicated feed, if the medication has a milk or meat withdrawal or if the medication is prohibited for use in lactating cattle (e.g. Deccox® 6% Premix in calf feed). The SOP must contain enough information to ensure that someone feeding animals would not cause a hazard to milk or meat. A sample form is provided in the Workbook (Record 7). **The same Best Management Practices that apply to livestock treatments, such as antibiotics, apply to medicated feeds.** You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey:**

- ✓ Clearly identify all medicated feed storage areas, feed bins and carts for those that deliver feed (e.g. feed-truck drivers) and for those that use it (e.g. employees). Medicated feed storage areas, bins and carts must indicate that the feed is medicated and indicate the target group of animals the feed is intended for (numbering a bin is not adequate). This will ensure that medicated feed is delivered to the correct area or bin and it will also ensure that staff feed the medicated feed to the correct group of animals.
- ✓ Follow recommended milk and meat withdrawal times for all feed medications and additives.

- ✓ Use only approved feed medications, vNHPs and feed additives.
- ✓ Use feed medication according to the label or written instructions from a veterinarian.
- ✓ Record all animals (e.g. calves, replacement heifers, lactating or dry cattle) being fed medicated feed on the livestock treatment record, when records are required (see Chapter 4, Section 4.6.1). Animals can be recorded as individuals or groups, provided that groups can be properly identified.

### **Rule of Thumb:**

#### **If a product has on the label or on the veterinary prescription:**

- A milk or meat withdrawal, **producers must record its use.**
- No milk or meat withdrawal, **producers do not need to record its use.**

### **If Mixing Feed with Medication or Medicated Feed:**

- ✓ Follow feed mixing instructions to ensure correct amount of medication or medicated feed is used.
- ✓ Ensure feed is adequately mixed to prevent “hot spots” of medication. If feed is not mixed thoroughly, medication may be concentrated in pockets of the feed, resulting in some cattle getting higher doses of medication than others and potentially causing a meat or milk residue concern. Remember, the feed type (moisture, fibre length, quantity, etc) will impact mixing time.
- ✓ Ensure medicated feed is fed to the appropriate group of animals.
- ✓ After feeding a group of animals medicated feed, if the feed would cause a milk or meat withdrawal for the next group of animals to be fed, always have any remaining medicated feed in augers, bins, feed mixers, etc. flushed with ‘clean’ feed to ensure there is no co-mingling of ‘clean’ feed with medicated feed. Dispose of flushed feed.
- ✓ If medicated feed is mixed and/or fed to other species (e.g. chickens, hogs) on the farm and the same mixing and feeding equipment is used for cattle, prevent feeding residues to dairy animals by cleaning the equipment or flushing the equipment with clean feed. Dispose of flushed feed.
- ✓ Ensure all scales and metering devices used are calibrated annually.
- ✓ Have written procedures for:
  - Mixing.
  - Calibration of scales and metering devices.

- ✓ **Pending:** New Federal regulations are being developed for medicated feeds in Canada. Once they are finalized, commercial and on-farm manufacturers of medicated feed will be required to have a license. See side bar.

The Regulations Respecting the Making of Medicated Feed (under the Health of Animals Act) is being developed and will require licensing and upgraded control measures for all commercial and on-farm manufacturers of medicated animal feeds in Canada. Once the regulations are published, they will be phased in over two to three years. The license requirements will include an application to the Canadian Food Inspection Agency (CFIA), an application fee, test results for equipment used in manufacturing feed, test results of concentrations of medication ingredients in feed sample and an inspection by a CFIA inspector.

The benefits of the regulations will include: increased assurances to buyers that they are getting what they want, better assurances of safe meat, milk and eggs for consumers, creation of a national registry of medicated feed manufacturers, and better records to facilitate trace-backs in the event of a recall.

- ✓ More information on treating animals is found in Chapter 4.

## 2.2 FEEDS AND FEEDING

The Canadian Food Inspection Agency is responsible for regulating feed for animals through the Feeds Act. Schedule IV of the Feeds Act lists all of the approved feeds for livestock. The list provides producers with a reference on which feeds they can freely provide to cattle and which feeds are excluded.

Some general Best Management Practices for feeds and feeding are:

- ✓ Ensure that pet foods and feeds that are labeled not for use for ruminants are **not fed** to dairy cattle. These feeds are labeled with the warning: "Feeding this product to cattle, sheep, deer or other ruminants is illegal and is subject to fines or other punishment under the Health of Animals Act." Please note that pet foods will not contain a warning but they should not be fed to cattle (see side bar). If there is feed on the farm used for non-ruminant livestock (e.g. hogs or chickens), the feed may be designated not for use for ruminants; therefore, this feed must be properly stored and handled in a manner to prevent contaminating cattle feed (e.g. stored separately, properly labeled and if mixed using the same mixing and/or distribution systems, the equipment must be flushed with "clean" feed). All flushed feed must not be fed to cattle.
- ✓ **Ensure feed received on the farm is not contaminated.** All newly purchased feed should be considered a potential health risk. All feeds should be purchased from feed manufacturers and/or feed supplier(s) that have recognized HACCP-based plans in place. Newly-purchased feed, including forages, should be scrutinized and

Pet foods may contain ruminant by-products, and, therefore, must be stored in a manner that prevents cattle access and contamination of cattle feed with pet food.

sampled. Samples should be analyzed for basic nutrient content with sub-samples saved for future testing should a problem arise. If feed is suspect, consult with a nutritionist, veterinarian or dairy specialist.

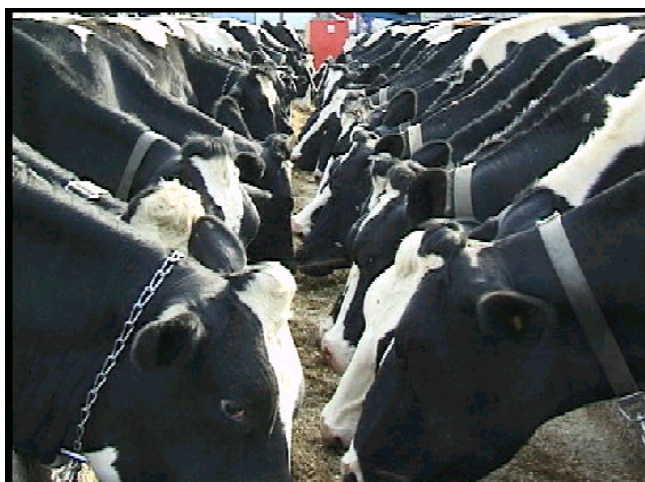
- ✓ **Avoid contamination of feed with pathogenic bacteria, particularly manure.** Pathogenic contamination of feed is usually caused by fouling of feed with manure. Diseases such as *Salmonella* and *Neospora* can be linked to manure contaminated feed. Some practices that can help avoid feed contamination are:
  - Ensuring feeding equipment (e.g. front-end loaders) is not contaminated with manure. If equipment is used for manure and feed, manure should be washed off before using the equipment for feeding.
  - Avoiding standing or walking in feed bunks. In drive-through feed alleys, do not step on the feed itself.
  - Avoiding fouling of feed by vermin, pets or wildlife (e.g. birds, cats, dogs, coyotes, deer). Wildlife control can be difficult for a producer to achieve; however, a pest control program can be put in place in barns and feed storage to minimize the impact of vermin, pets and wildlife. **See Chapter 1 for more details on pest control.**
- ✓ **Maintain a biosecurity program for feed.** Biosecurity describes management practices that help prevent entry of contamination into the herd. To do this, the producer must:
  - Know the source of origin of all materials.
  - Know how the feed or feed additive interacts with other feed components and the animal.
  - Protect the herd from contamination by maintaining clean and dry feed environments.
  - Clearly mark all feed storage bins, commodity sheds and general storage areas.
- ✓ **Keep accurate records of all potential residue sources.** It is a proven fact that communication is critical in preventing residues. To ensure all necessary parties are informed, set up a pathway of information that includes family, staff, veterinarian(s), relief milkers, feeders — anyone who may come in contact with the herd. Make everyone responsible for checking the records before they feed. Maintain a record of feeds and feed ingredients grown or received on the farm.

Use notice boards and permanent record-keeping charts of any potential feed contamination or if any feed or feed additive is being used anywhere on the farm. Use a central location for up-dates, making one person responsible for daily up-dates. Date the board so everyone knows if information is current.
- ✓ **Know how and when to use labs and test kits.** If you suspect that a feed may be contaminated, you could have the feed tested. Not all potential contaminants are easily tested for. Some may be picked up in the milk with simple cow-side test kits (e.g. antibiotic residues in milk). Others (e.g. pesticides) may require more elaborate

lab tests with some knowledge of what specific chemical is being traced. See Chapter 5 for more information on using on-farm test kits (antibiotic milk residues).

To collect an appropriate feed sample, follow instructions provided by the laboratory. The following are general guidelines:

- Retain a sample of purchased or homegrown feed for future reference.
- Clearly label all samples with name of product, source, storage location, date of sampling, and requested test.
- Use proper sampling techniques to get a representative sample.
- Check with the lab beforehand to determine size of sample and whether special handling or storage of sample is required.



## 2.3 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                                                       | SOURCE                                                                                                                                                        | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BIOLOGICAL</b>                                            |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Pathogens (bacterial, viral and TSE's) and parasites in feed | Contaminating feed supply: <ul style="list-style-type: none"> <li>• Ruminant by-products</li> <li>• Manure</li> <li>• Pathogens from sewage sludge</li> </ul> | <input type="checkbox"/> Store and handle feeds designated not for use for ruminants and pet foods to avoid feeding those feeds to cattle or cross-contaminating feeds for cattle.<br><input type="checkbox"/> Ensure cattle do not have access to and are not fed pet foods or feeds that are labeled not for use for ruminants.<br><input type="checkbox"/> Store and handle pet foods and feeds that are labeled not for use for ruminants separately from ruminant feed.<br><input type="checkbox"/> Maintain a biosecurity program for feed supply.<br><input type="checkbox"/> Ensure feed facilities, equipment and feeding methods minimize manure contamination.<br><input type="checkbox"/> Follow stated withdrawal times before grazing or harvesting crops treated with sewage sludge or manure.<br><input type="checkbox"/> Control vermin.<br><input type="checkbox"/> <b>See Chapter 1.</b> |
| <b>CHEMICAL</b>                                              |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Feed medications and additives                               | <ul style="list-style-type: none"> <li>• Medicated feeds and/or feed additives</li> </ul>                                                                     | <input type="checkbox"/> If medicated feeds are fed, have an SOP in place on how to feed medicated feed.<br><input type="checkbox"/> If medicated feeds are received, mark bins.<br><input type="checkbox"/> Follow storage and administration Best Management Practices required for all medications, including recommended milk withdrawal times for all medicated feed.<br><input type="checkbox"/> Ensure that your feed supplier has a valid medicated feed license for any medicated feed used on farm (Pending legislation).<br><input type="checkbox"/> Ensure feed manufacturers and suppliers use a HACCP-based system.<br><input type="checkbox"/> Prevent cross-contamination of feed.<br><input type="checkbox"/> Clearly mark feed bins.<br><input type="checkbox"/> Keep samples of incoming feeds and ingredients.<br><input type="checkbox"/> <b>See Chapters 2, 3 and 4.</b>              |

## 3.0 ANIMAL HEALTH AND BIOSECURITY (BMP 3)

### Index:

|                                                                                        |
|----------------------------------------------------------------------------------------|
| <b>Animal Identification</b>                                                           |
| <b>Health Management – Preventing, Controlling and Treating Common Cattle Diseases</b> |
| <b>Summary of Hazards and Best Management Practices</b>                                |



### Workbook Self-Evaluation Questions:

#### BMP 3 Animal Health and Biosecurity

Maintaining good animal health is essential to producing high quality milk and meat.

| <i>Reference Manual Chapter 3</i> |                                                                                                                                                                                          |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Animal Identification</b>      |                                                                                                                                                                                          |
| <b>18.</b>                        | Do you identify all cattle according to the National Livestock Identification for Dairy (NLID) program or according to Agri-Tracabilité Québec?                                          |
| <b>19.</b>                        | Do you identify all cattle to allow for the maintenance of treatment records? (e.g. ear tags)                                                                                            |
| <b>Health Management</b>          |                                                                                                                                                                                          |
| <b>20.</b>                        | Do you have measures in place to prevent the introduction of infectious disease or diseased animals to the existing herd?                                                                |
| <b>21.</b>                        | Have you developed a plan for the prevention and prevention of the spread of common diseases including environmental and contagious mastitis in consultation with the herd veterinarian? |
| <b>22.</b>                        | Do you determine if any animals you purchase contain chemical residues (e.g. antibiotics, inhibitors) or broken needles?                                                                 |

## Introduction

Maintaining good animal health is essential to producing high quality milk and meat. Animal identification is essential in ensuring that health and treatment records can be kept. Animal health management helps to prevent problems from entering or spreading within the herd.

### 3.1 ANIMAL IDENTIFICATION

Permanent identification of all cattle is essential to maintain records of animal treatments. Since January 1, 2001, all cattle in Canada must be identified according to the National Livestock Identification (NLID) strategy before they leave their herd of origin. NLID requires that cattle be identified with approved national tags before they are co-mingled with cattle from other herds or before they leave the farm. Although it is not required yet by NLID, ideally, producers should identify calves with approved national tags at birth.

**Please note:** In Quebec the cattle identification system is called Agri-Tracabilité Québec and this system is equivalent to the NLID program. Agri-Tracabilité Québec requires animals born in Quebec to be tagged within 7 days of birth or before being transferred from the farm of origin, whichever comes first. Animals brought into Quebec must be tagged as soon as they arrive on the farm.

Because it is not compulsory to comply with NLID until cattle are mixed or leave the farm, some producers may need a supplementary, permanent system to identify resident cattle on their farm. The identification system must provide a unique identifier for each animal that can be easily recognized and understood by everyone treating or milking cattle. The identifier must be permanently applied to the animal and must not merely mark its stall. There are several commercial tags that can be applied to the ears or brisket to establish permanent identification.

In addition to having a method of permanently identifying all cattle, it is useful to have a method for short-term identification of treated cattle (e.g. coloured velcro leg bands). Several strategies for short-term identification are listed in Chapter 4.



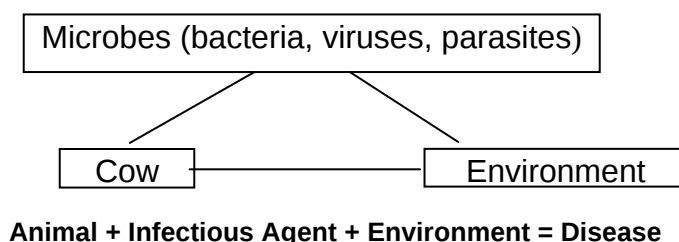
## 3.2 HEALTH MANAGEMENT - PREVENTING, CONTROLLING AND TREATING COMMON CATTLE DISEASES

Diseases like mastitis have a direct impact on milk quality and some infectious agents may contaminate milk directly. The impact of other diseases may be less direct, for example, animals with a severe infectious disease such as, Salmonellosis or BVD, may have an increased chance of developing environmental mastitis. Any illness that requires treatment with livestock medicines increases the risk of drug residues contaminating milk and meat.

All infectious diseases of cattle result from the interplay between the animal and its ability to resist disease (its immunity), an infectious agent (see Table 3) and the environment.

Preventive programs for dairy herds have two components: a **vaccination plan** and a **biosecurity plan**. Done correctly, a vaccination program significantly increases disease resistance. A biosecurity plan reduces the risk of infectious diseases entering the herd, or from spreading if they do enter the herd. See Figure 3 below.

**Figure 3: Relationship between disease, animals, infectious agents and the environment**



**Table 3: Major Infectious Agents (Bacteria, Viruses and Parasites) of Dairy Cattle and Their Primary Means of Transmission**

| DISEASE                                                                                           | SPREAD BY                                                                                                           |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Bovine viral diarrhoea (BVD)                                                                      | <ul style="list-style-type: none"> <li>direct contact with infected cattle or their body fluids</li> </ul>          |
| Contagious mastitis ( <i>Staph. aureus</i> , <i>Strep. agalactiae</i> , <i>Mycoplasma bovis</i> ) | <ul style="list-style-type: none"> <li>contact with infected milk, usually at milking</li> </ul>                    |
| Bovine leucosis virus                                                                             | <ul style="list-style-type: none"> <li>contact with blood of infected cattle</li> </ul>                             |
| IBR, BRS and PI <sub>3</sub> viruses                                                              | <ul style="list-style-type: none"> <li>the air or contact with infected cattle</li> </ul>                           |
| <i>E. coli</i> , rotavirus and corona virus                                                       | <ul style="list-style-type: none"> <li>contact with manure from infected cattle</li> </ul>                          |
| Salmonellosis                                                                                     | <ul style="list-style-type: none"> <li>contact with manure from infected animals</li> </ul>                         |
| Leptospirosis                                                                                     | <ul style="list-style-type: none"> <li>contact with urine from infected carrier cattle and other animals</li> </ul> |
| Johne's disease (paratuberculosis)                                                                | <ul style="list-style-type: none"> <li>contact with colostrum, milk or manure from infected cattle</li> </ul>       |
| Digital dermatitis, heel warts                                                                    | <ul style="list-style-type: none"> <li>contact with environment of infected cattle</li> </ul>                       |

Many cattle that become sick with common diseases on dairy farms are treated routinely by the producer or by farm personnel rather than by a veterinarian directly. Examples of diseases that are often routinely treated by producers include diarrhea and pneumonia in calves and milk fever and mastitis in cows. Because any treatment increases the risk of residues in meat or milk, treatments should be given according to pre-arranged protocols. Plans should be developed by the herd veterinarian in consultation with the producer. They should be written so that they are easily understood by the people who will be implementing them. They should be readily available to all farm personnel when needed.

Treatment plans can be in several formats. A vaccination protocol would outline the recommended vaccination procedures for each management group on the dairy. It would include information on the vaccine to be used and dosage, the group to be vaccinated and recommendations on when they should be vaccinated. Treatment protocols for diseases or conditions should contain information on how to recognize affected cattle and on separate action steps that are related to the severity of the illness. Detailed treatment and management recommendations should be outlined in the protocol as well as actions to be taken if the animal's health does not substantially improve or becomes worse.

Treatment plans are not intended to replace the herd veterinarian: they are intended to reduce the possibility of misunderstandings and to increase the likelihood of compliance with health plans.

### 3.2.1 Vaccination

Vaccination is an essential component of every disease prevention plan. It primes an animal's immune system to respond quickly to a subsequent infection by specific microbes, usually viruses and bacteria. The quicker immune response of vaccinated cattle will often prevent disease from developing and if they do develop disease, they may not get as sick.

Vaccination also can reduce the spread of disease-causing microbes. Reducing the impact of infection on an animal's health helps maintain its productivity and reduces the need for treatment.

Vaccination relies on the response of the animal's immune system to provide protection. Its effectiveness depends on the vaccine being properly stored, handled and administered to an animal whose immune system is able to respond to the vaccine.

**Vaccination helps prevent disease or reduce its severity, but does not treat or cure existing disease.**

#### 3.2.1.1 Planning and Record Keeping

Vaccination provides the best protection when it is part of a complete health program. Developing and implementing a vaccination plan involves:

- Determining what diseases to vaccinate against.
- Identifying which animals will benefit most from vaccination.

- Finding out when they will most need the protection that vaccines provide.
- Ensuring cattle are vaccinated according to the plan.

For most dairy herds in Canada, a basic strategic program should include vaccinating breeding-age cows and heifers against BVD and IBR. The goal is to protect cows and heifers against abortions and other infertility problems caused by these two viruses.

To ensure cattle are protected throughout pregnancy, they should be vaccinated before they are bred. **Because protection is highest shortly after vaccination, heifers and cows will get the best protection if they are vaccinated in the months before they are bred.**

Your veterinarian may recommend vaccinating against other diseases such as Bovine Respiratory Syncytial Virus (BRSV), Parainfluenza 3 virus (PI3), *Hemophilus somnus* (HS), Pasteurellosis, Rabies, *E. coli* scours, Rotavirus, Coronavirus, coliform mastitis, Leptospirosis (Lepto) or Clostridial diseases such as blackleg in your herd's vaccination program. These recommendations will be based on a consideration of the special needs of your herd, and knowledge of which diseases occur locally. Producers should:

- ✓ Develop a written vaccination plan in consultation with the herd veterinarian. The plan should include:
  - Identification of specific disease-causing risks.
  - Which group is at risk.
  - When protection is most needed.
- ✓ Identify vaccinated animals and keep written records to ensure calves, breeding heifers, and cows are vaccinated according to the plan.

**Note:** Vaccines may have milk or meat withdrawals. If a vaccine has a withdrawal, applications must be recorded on the livestock treatment record (Record 10). Vaccines must also be on the list of medicines and chemicals used on livestock (Record 9). See Chapter 4 for more details.

- ✓ Keep records which may include:
  - Name of the vaccine product used (including the lot or serial number and expiry date).
  - The date the vaccine was used.
  - Identification of the vaccinated cattle.
  - Any applicable milk or meat withdrawals.

### 3.2.1.2 Managing Vaccines

- ✓ Store and use vaccines according to recommendations on the label. It is especially important to ensure that vaccines are properly refrigerated and stored in a dark place, such as a cooler.
- ✓ If using live vaccines, mix only enough to last for an hour or less.
- ✓ Discard any leftover vaccine.

- ✓ Mix vaccines using a transfer needle or a designated mixing syringe that will not be used to vaccinate cattle.

### 3.2.1.3 Maintaining Syringes

- ✓ Use clean syringes and clean, sharp needles.
- ✓ Clean syringes used for modified live vaccines by flushing only with hot water.
- ✓ Mild disinfectant can be used to clean syringes used for killed vaccines.
- ✓ Use 16-gauge, 1-inch needles for subcutaneous injections and 16-gauge, 1.5-inch for intramuscular injections. If given a choice on the vaccine label, always use the subcutaneous route.
- ✓ If the same needle is used on several cattle, change needles often — at least after every 10 uses, or immediately, if the needle becomes dull, burred, bent or broken.
- ✓ Ideally, use a new needle on every animal because using the same needle on more than one animal may spread infections such as bovine leucosis virus.

### 3.2.2 Biosecurity Plan

Even the most extensive vaccination program can control only a small number of the many microbes that cause infectious diseases in dairy cattle. Producers need some strategy, a biosecurity plan, to protect their herd against other major infectious diseases including diseases carried by other animals. The biosecurity plan should be developed in consultation with the herd veterinarian.

Biosecurity refers to management practices that reduce the risk of infectious diseases entering a farm. A biosecurity plan should also contain best management practices to reduce the impact of diseases that are already present within the herd.

A biosecurity plan does not completely eliminate the risk of infectious diseases entering a dairy herd. A biosecurity plan does allow producers to reduce and manage the risk.

#### 3.2.2.1 Reducing the Risk of Introducing Infected Cattle

The most effective policy to prevent the introduction of infectious diseases is to keep a closed herd. In a closed herd, no new animals enter nor do resident cattle re-enter after they have left the herd. Although this may be the ideal strategy, achieving a closed herd can be difficult.

Whenever you plan to introduce new cattle, make sure you purchase those animals from a reputable source and ensure that those animals are healthy, and do not carry any problem diseases, chemical residues or broken needles. Also, make certain **your own cattle** are vaccinated before bringing new cattle into the herd. Even if you have vaccinated, it is worthwhile to review vaccination records to see if cattle were vaccinated at least as often as stated on the vaccine label.

Whenever you plan to introduce new cattle, make certain your own cattle are vaccinated before bringing new cattle into the herd.

Vaccinate any calves over six months old that have not been vaccinated yet. In special circumstances, younger calves may be vaccinated, even though you will have to

vaccinate them again when they reach six months.

Table 4 lists the various strategies for introducing cattle, ranked according to increasing risk.

**Table 4: Biosecurity Strategies and Their Risks When Introducing New Cattle**

| RISK         | LEVEL OF CONTACT WITH NEW CATTLE                                                                                                                                                  |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low          | <ul style="list-style-type: none"> <li>No entry or re-entry of cattle.</li> </ul>                                                                                                 |
| Moderate–low | <ul style="list-style-type: none"> <li>No entry of new cattle but re-entry allowed, e.g., return of show cattle.</li> <li>Contact in pastures with neighbouring herds.</li> </ul> |
| Moderate     | <ul style="list-style-type: none"> <li>Entry of new cattle with known medical history, use isolation, and testing for infection with selected diseases.</li> </ul>                |
| High         | <ul style="list-style-type: none"> <li>Entry of new cattle with known medical history with no isolation nor testing for infection with specific diseases.</li> </ul>              |
| Very high    | <ul style="list-style-type: none"> <li>Entry of new animals with no medical history (or source unknown) with no isolation or testing for specific diseases.</li> </ul>            |

## 3.2.2.1.1 Medical history

The term ‘medical history’ refers to the health history of the originating herd as well as the history of the individual animal that will be purchased — information you should request as a potential buyer.

A medical history should be completed on a herd or individual basis. A complete record or written plan would include data that is collected historically, during quarantine and upon arrival. Information collected could include:

- Original source of the animal(s).
- Individual somatic cell count, linear score or California Mastitis Test (CMT) in current and previous lactations or bulk tank somatic cell count.
- Results of any bacterial or mycoplasmal culture of their milk.
- Dates of previous freshenings and any history of abortion or infertility.
- History of vaccination (including specific product and dates used, particularly the details of the primary series if killed vaccines were used).
- History of treatments.
- Any blood tests or tests performed on milk completed e.g. BVD, *Neospora*, Bovine Leukosis and Johne’s Disease.
- The transporter used.

### 3.2.2.1.2 Transporting new cattle

Purchased cattle may also be exposed to infectious diseases during transport. To reduce the risk of this:

- Transport purchased cattle in farm-owned trucks.
- Ensure hired transporters start out with a clean truck or trailer.
- Limit access by hired transporter personnel to cattle on your farm.

### 3.2.2.1.3 Isolating new cattle

Newly acquired animals should be isolated on arrival and tested to prevent the introduction of specific diseases (see Table 5). The degree of isolation determines how well disease transmission will be prevented.

**Table 5: Isolation to Prevent Disease**

| WHAT TO DO                                                             | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prevent introduction of BVD by cattle acutely infected with BVD virus. | <input type="checkbox"/> Isolate new purchases that may have been recently exposed to the BVD virus for 3 to 4 weeks.<br><input type="checkbox"/> Keep separated - do not permit direct contact with resident cattle.<br><input type="checkbox"/> Do not let quarantined cattle share feed bunks, waterers or grooming tools.<br><input type="checkbox"/> If cows or heifers are pregnant at arrival, isolate and test the calf at birth.                                                                                                                                                                              |
| Check animal health regularly.                                         | <input type="checkbox"/> Check for signs of illness regularly, including taking temperatures.<br><input type="checkbox"/> Do not ignore signs of illnesses — have the animal examined by a veterinarian.<br><input type="checkbox"/> Extend the period of isolation if animals become ill.                                                                                                                                                                                                                                                                                                                             |
| Test for common diseases.                                              | <input type="checkbox"/> Arrange normal testing with your veterinarian.<br><input type="checkbox"/> Have a blood test performed to test for persistent infection with BVD virus, <i>Neospora caninum</i> or Bovine leucosis virus.<br><input type="checkbox"/> Have a milk test, blood test and special bacterial culture of manure performed to detect Johne's disease (paratuberculosis).<br><input type="checkbox"/> A somatic cell count and California Mastitis Test combined with milk culture can detect contagious mastitis such as <i>Staph aureus</i> , <i>Strep. agalactiae</i> , <i>Mycoplasma bovis</i> . |
| Vaccinate introduced cattle.                                           | <input type="checkbox"/> Vaccinate new purchases during the isolation period even if they have been vaccinated previously.<br><input type="checkbox"/> If possible, arrange for vaccination and tests before they leave the seller's farm.                                                                                                                                                                                                                                                                                                                                                                             |
| Use a foot bath.                                                       | <input type="checkbox"/> Consider using a medicated foot bath or spray before allowing purchased cattle to enter the herd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Use proper milking hygiene.                                            | <input type="checkbox"/> Prevent the possible spread of contagious mastitis by using proper milking hygiene — refer to Chapter 5 for more information on controlling the spread of contagious mastitis.                                                                                                                                                                                                                                                                                                                                                                                                                |

### 3.2.2.1.4 Biosecurity to prevent the introduction of contagious mastitis

Contagious mastitis (for example, *Staph. aureus* and *Strep. agalactiae*) can be carried onto a farm by infected cattle. The onus is on the purchaser of cattle to reduce the risk when they buy cows or heifers. Reduce risk by following the practices outlined in the Table 6.

**Table 6: Biosecurity Best Management Practices to Prevent the Introduction of Contagious Mastitis**

| WHAT TO DO                                | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check herd udder health                   | <input type="checkbox"/> Request information (e.g., bulk tank somatic cell count) on the udder health of the herd of origin.                                                                                                                                                                                                                                                                  |
| Check herd milk quality records           | <input type="checkbox"/> Request information on bacterial or mycoplasmal culture of milk from the bulk tank or from individual animals in the herd, and records of treatments for clinical mastitis.                                                                                                                                                                                          |
| Check cow/heifer milk quality records     | <input type="checkbox"/> Request information on the udder health of the individual animals being considered for purchase: <ul style="list-style-type: none"> <li>• Somatic cell count - current and previous lactations.</li> <li>• History of cases of clinical mastitis.</li> <li>• Information on previous milk cultures.</li> </ul>                                                       |
| Check udder and milk from cow/heifer      | <input type="checkbox"/> Examine the udder and milk from cattle considered for purchase. <ul style="list-style-type: none"> <li>• Screen for subclinical mastitis using the California Mastitis Test or somatic cell count from a composite milk sample.</li> <li>• Culture a composite milk sample.</li> <li>• Examine the udder (e.g. heat, hardness, abnormal conformation).</li> </ul>    |
| Segregate new animals and milk separately | <input type="checkbox"/> Assume newly purchased cattle (including heifers) have contagious mastitis until the results of testing prove otherwise. Until results of the tests are known, milk these cattle <ul style="list-style-type: none"> <li>• After milking the cattle in your herd known not to have contagious mastitis.</li> <li>• Before milking cattle known to have it.</li> </ul> |

### 3.2.2.2 Reducing the Risk of Infectious Diseases Entering by Other Means

Not all infectious diseases of cattle are transmitted only by cattle. Some can also be transmitted by other animals (including insects, rodents and birds), people, and objects — particularly any object that can be contaminated with manure. Table 7 can help you reduce the risk of introducing infectious diseases.

**Table 7: Best Management Practices to Prevent Introduction of Infectious Diseases**

| SOURCE OF RISK                                                  | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| People                                                          | <ul style="list-style-type: none"> <li><input type="checkbox"/> Limit people's access to the barn.</li> <li><input type="checkbox"/> Post a warning sign asking visitors to keep out — it helps to provide information on the sign — who to contact or a telephone number to call.</li> <li><input type="checkbox"/> Ensure visitors wear clean boots and coveralls in the barn; this is particularly important if visitors have already been in other barns.</li> <li><input type="checkbox"/> Provide coveralls and boots in the barn for visitors to wear — large size will fit most visitors.</li> <li><input type="checkbox"/> Provide disposable plastic boots; however, they wear through easily if people drag their feet when walking.</li> <li><input type="checkbox"/> Keep a record of visitors as an aid to controlling farm traffic.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Livestock                                                       | <ul style="list-style-type: none"> <li><input type="checkbox"/> Have bull calves and other sale animals picked up without allowing the dealer or transporter to enter the barn.</li> <li><input type="checkbox"/> Use your own halters and ropes.</li> <li><input type="checkbox"/> Have animals for dead stock removal picked up from outside cattle housing areas.</li> <li><input type="checkbox"/> If you borrow or loan equipment, make sure it has been cleaned before using it on your farm e.g. hoof trimmer.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Vermin (e.g. rodents, flies, birds, wildlife and other animals) | <ul style="list-style-type: none"> <li><input type="checkbox"/> Introduce vermin control program for the farm.</li> <li><input type="checkbox"/> Prevent the contamination of cattle feeds with faeces from animals, including farm cats, dogs, deer and birds.</li> <li><input type="checkbox"/> Use licensed pest control contractors when necessary.</li> <li><input type="checkbox"/> Report all sightings of pests.</li> <li><input type="checkbox"/> Develop routine surveillance of buildings and perimeters for conditions that encourage pests.</li> <li><input type="checkbox"/> Limit access by birds to barns, feed and bedding storage areas (porthose covers, screens over doors and windows).</li> <li><input type="checkbox"/> Apply appropriate measures of insect control, (e.g. removal of any spilled grain, electronic fly killers provided, properly placed and maintained).</li> <li><input type="checkbox"/> Store grain in bird-proof containers.</li> <li><input type="checkbox"/> Use waterers that are too deep for birds to stand in.</li> <li><input type="checkbox"/> Keep water levels below a level that can be reached by birds perched on the edge.</li> <li><input type="checkbox"/> Use netting on the underside of rafters to discourage roosting and nesting.</li> <li><input type="checkbox"/> Close in roosting ledges or installing perch repellents (sharp wire or nails protruding from a solid base).</li> <li><input type="checkbox"/> Prevent access to rafters and ledges.</li> <li><input type="checkbox"/> Remove nests.</li> </ul> |

### 3.2.3 Decreasing Exposure to Infectious Disease within the Herd

Properly disposal of dead stock and management of calf health can help decrease the herd's exposure to infectious disease.

#### 3.2.3.1 Proper Disposal of Dead Stock

- ✓ Remove the carcasses of dead animals within 48 hours (ideally 24 hours) of death by professional dead stock removal services or renderers.
- ✓ Check with local authorities about permissible alternative methods of dead stock disposal.

#### 3.2.3.2 Maintaining Calf Health

For calves, older cattle are a significant source of infectious diseases (see Table 8). Young calves are more susceptible to many diseases, because their immune systems are not prepared to combat infections. As a result, young calves often become more seriously ill from an infection that might cause mild disease in older cattle. In addition, some diseases like Johne's disease are much more easily spread to young calves than to older cattle.

**Table 8: Diseases that can be Spread from Cattle to Calves**

| DISEASE                                                                         | SPREAD BY                                                                                                                                    |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| BVD                                                                             | <ul style="list-style-type: none"> <li>• Contact with infected calf or cow.</li> </ul>                                                       |
| Pneumonia from IBR, PI3, BRSV and other microbes                                | <ul style="list-style-type: none"> <li>• Contact with nasal secretions from infected cattle and sharing air with infected cattle.</li> </ul> |
| Calf scours from rotavirus, coronavirus, <i>E. coli</i> , <i>cryptosporidia</i> | <ul style="list-style-type: none"> <li>• Manure from infected cattle or contaminated feeding equipment.</li> </ul>                           |
| Johne's disease                                                                 | <ul style="list-style-type: none"> <li>• Colostrum, milk and manure from infected cattle.</li> </ul>                                         |
| Salmonellosis                                                                   | <ul style="list-style-type: none"> <li>• Colostrum, milk and manure from infected cattle.</li> </ul>                                         |
| Bovine leucosis virus                                                           | <ul style="list-style-type: none"> <li>• Colostrum, milk and blood from infected cattle.</li> </ul>                                          |
| Lung, intestine and stomach worms                                               | <ul style="list-style-type: none"> <li>• Eggs or immature worms in manure of infected cattle.</li> </ul>                                     |
| Coccidiosis                                                                     | <ul style="list-style-type: none"> <li>• Eggs in manure of infected cattle.</li> </ul>                                                       |

Some Best Management Practices to help reduce the spread of disease from older to younger cattle are:

- ✓ Ensure maternity area is clean and dry.
- ✓ Separate new-born calves from cows/heifers within a few hours of birth.
- ✓ Wash the udder, as if for milking, before harvesting colostrum.
- ✓ Prevent the introduction of microbes that cause disease being passed to the calf in colostrum (e.g., Bovine leucosis virus and the Johne's disease bacterium).

- ✓ Ensure the calf receives 4 litres of colostrum milk within the first 12 hours of life, and ideally, within the first 6 hours.
- ✓ Rear calves in individual pens, such as calf hutches, to reduce the risk of transmitting infections from older calves and adult cattle.
- ✓ Clean bedding of calf housing facilities regularly to reduce the number of microbes in the calves' environment.
- ✓ Clean and sanitize buckets, bottles, nipples and other feeding equipment before every use.
- ✓ Store and handle equipment so it does not become re-contaminated.

### 3.2.4 Udder Health

A healthy udder is essential to the production of high quality milk. Mastitis, an inflammation in the udder, directly affects the yield, safety and quality of milk produced from an infected quarter. The need to treat some animals for mastitis increases the risk of milk becoming contaminated with inhibitors and other residues.

Whenever the udder becomes infected, an inflammatory response develops. This may appear as a change in the infected quarter, such as swelling and heat or as changes in the appearance of the milk.

**Mastitis is an inflammation in the udder and is usually caused by infectious organisms (microbes).**

Inflammatory cells are white blood cells that are present in milk and infected quarters even though there may be no other obvious change in the appearance of the milk. These cells are measured by the somatic cell count (SCC) reading available through production recording services and as part of your regulatory grading requirement.

Inflammatory cells in milk can also be detected, less accurately, by using the California Mastitis Test (CMT) shown in Table 9 or, indirectly, by measuring the electrical conductivity of milk.

**Table 9: Relating CMT Values to Somatic Cell Count on Milk of Individual Animals**

| CMT SCORE | GELLING                                                      | APPROXIMATE SCC/ml |
|-----------|--------------------------------------------------------------|--------------------|
| 0         | None                                                         | 100,000            |
| Trace     | Slight                                                       | 300,000            |
| 1         | Forms distinct gel                                           | 900,000            |
| 2         | Quickly forms a distinct firm gel                            | 2,700,000          |
| 3         | Distinct gel that moves to the centre and away from the edge | 8,100,000          |

Adapted from: *Mastitis: Counter Attack*, by W.Nelson Philpot, Ph.D. and Stephen C. Nickerson, Ph.D. Published by Babson Bros. Co. 1991.

**Clinical mastitis** refers to mastitis that leads to obvious changes in the milk, the quarter, or the animal. **Subclinical mastitis** usually does not cause obvious changes in the animal or milk and can only be identified using a test such as the SCC or CMT.

With only a few exceptions, microbes that cause mastitis enter the udder through the teat. As a result, only one or two quarters are infected at one time. Less commonly, infections can spread through the blood. When this happens, all four quarters usually become infected; therefore, it is wise to sample all quarters for bacterial culture.

The symptoms of clinical mastitis and the tests used to identify subclinical mastitis identify which animals have udder infections. However, they do not tell what is causing the mastitis.

Mastitis can be separated into two types, according to the source of the microbes causing the mastitis:

- **Contagious mastitis** can be either clinical or subclinical, but most often is subclinical.
- **Environmental mastitis** can also be clinical or subclinical, but is often clinical.

Although we differentiate contagious and environmental to help understand how to control and prevent mastitis, an animal may have both types of mastitis at the same time.

### 3.2.4.1 Contagious Mastitis

Contagious mastitis is an infection of the udder with microbes that originated in the udder of another infected animal. With only a few exceptions, the microbes that cause contagious mastitis enter the uninfected quarter through the teat canal. The infection is usually spread during milking.

The microbes that cause contagious mastitis are adapted to live in the udder (for common names see Table 10). As a result, they can survive for long periods of time in an infected quarter. In some cases, the infection may last for the entire life of the cow.

In most cases, contagious mastitis causes neither clinical mastitis nor obvious changes in the milk. Subclinical infections caused by contagious microbes are often best detected using individual cow/heifer SCC information or the CMT. These tests can be used to detect which animals or quarters are infected, but they cannot tell which microbe is actually causing the mastitis. **A milk culture is needed to determine which microbe is causing the mastitis.**

Like any contagious disease, contagious mastitis can be carried into a previously uninfected herd by the introduction of an infected cow or heifer.

**Table 10: Microbes Causing Contagious Mastitis**

| SCIENTIFIC NAME                 | ALTERNATIVE NAMES                                                  |
|---------------------------------|--------------------------------------------------------------------|
| <i>Staphylococcus aureus</i>    | <i>Staph.</i> , <i>Staph. aureus</i> , hemolytic <i>Staph</i> , HS |
| <i>Streptococcus agalactiae</i> | <i>Strep.</i> , <i>Strep. ag</i> , SA                              |
| <i>Mycoplasma bovis</i>         | Mycoplasma, <i>M. bovis</i>                                        |
| <i>Arcanobacterium pyogenes</i> | <i>Coryne.</i> , heifer mastitis, summer mastitis                  |

## Best Management Practices to Control Contagious Mastitis:

- ✓ Use proper pre-milking sanitation practices to prevent the spread of bacteria from water and contaminated towels.
- ✓ Ensure that milking equipment is properly sized, maintained and attached.
- ✓ Use proper post-milking teat dipping practices with approved teat dip to prevent the spread of bacteria.
- ✓ Implement plans for investigating the cause and treating cases of clinical mastitis — in consultation with your veterinarian. This will ensure that the microbes causing mastitis are properly identified and treated.
- ✓ Treat all quarters with dry cow treatment at drying off to assist in treating existing infections and prevent new ones.
- ✓ Cull cows that are chronically infected with contagious mastitis to decrease the risk of new infections in the herd.
- ✓ Implement a biosecurity plan to prevent the introduction of animals with contagious mastitis.
- ✓ Milk infected or treated cows last or separately into a bucket.

## 3.2.4.2 Environmental Mastitis

Environmental mastitis results from infection of the udder by microbes (see Table 11) that come from the barn environment. Most of these microbes originate in cattle manure.

Environmental microbes lead to clinical mastitis more often than contagious microbes do, but many infections caused by environmental microbes do not lead to clinical mastitis. Most new environmental infections occur during the dry period and during the first 75 days after freshening.

The visible changes in milk that occur during clinical mastitis from environmental microbes are the result of the **reaction** by the udder to the microbes. In many cases of environmental mastitis, the microbes that cause the infection are eliminated from the udder before the milk looks abnormal. **This is one reason why a milk culture may be negative even when the milk is obviously abnormal.**

Practices that control the spread of contagious mastitis will not necessarily reduce infections by microbes that cause environmental mastitis.

**Table 11: Microbes that Cause Environmental Mastitis**

| SCIENTIFIC NAMES                                                               | ALTERNATE NAMES                                |
|--------------------------------------------------------------------------------|------------------------------------------------|
| <i>Escherichia coli</i> , <i>Klebsiella</i> sp., <i>Enterobacter aerogenes</i> | Coliform bacteria, coliforms, <i>E. coli</i> . |
| <i>Streptococcus uberis</i> , <i>Streptococcus dysgalactiae</i>                | <i>Strep.</i> non-ag, Environmental strep.     |

Sources of microbes that cause environmental mastitis include:

- Manure.
- Bedding.
- Feed.
- Dust and dirt.
- Mud.
- Water.
- Contaminated equipment (e.g. cracks in worn out liners).

Conditions that favour exposure of the udder to microbes in the environment include:

- Overcrowding.
- Dirty or wet dry-cow and maternity areas.
- Ventilation that does not adequately remove humidity.
- Manure and wetness accumulating in alleyways, feeding areas, exercise yards, pastures and stalls.
- Wet and dirty stalls.
- Muddy exercise yards.
- Access to ponds.
- Milking wet udders.

Many of the specific management steps that prevent and control environmental mastitis can be developed only after determining which specific environmental bacteria is causing the mastitis in the herd.

### **Best Management Practices to Prevent and Control Environmental Mastitis:**

- ✓ Ensure thoroughly cleaned and dried teats.
- ✓ Keep the milking cows' and dry cows' environment as clean as possible to reduce the incidence of environmental bacteria.
- ✓ Use proper pre-milking sanitation practices to prevent the exposure of the teat ends to bacteria.
- ✓ Dip teats prior to milking with a licensed product to reduce new cases of environmental mastitis. All pre-milking germicides must be in contact with the teat for at least 30 seconds and must be completely removed before attaching the unit. This

will reduce the number of environmental bacteria on the teat.

- ✓ Ensure that milking equipment is properly sized, maintained and attached. This will assist in reducing the incidence of bacteria entering the teat end.
- ✓ Follow recommended milking practices procedures to reduce the incidence of bacteria entering teat end and the milk.
- ✓ Use proper post-milking teat dip practices to reduce the spread of bacteria.
- ✓ Treat all quarters with dry cow treatment at drying off to treat existing infections and help prevent new ones.
- ✓ Vaccinate against coliform mastitis to reduce the severity of the impact of clinical mastitis due to coliform bacteria.
- ✓ Ensure ration provides adequate vitamins E and A, beta-carotene, selenium, copper and zinc to help maintain the animals' resistance to mastitis.

### 3.2.4.3 Milk Culture

A bacterial culture of milk is used to determine which microbe is causing mastitis. This information is essential when developing treatment, control and prevention plans.

In herds with a high bulk tank SCC, composite samples of all animals can be cultured or cattle may be selected on the basis of their individual SCC or CMT reaction. In herds with clinical mastitis, milk samples from only the affected quarter can be collected prior to treatment. Samples from these clinical cases can be stored frozen or refrigerated for later culture.

**It is extremely important to know which microbe is causing mastitis, since different microbes require different treatments and preventive measures.**

**A composite sample is one that contains equal amounts of milk from each quarter.**

Not all milk samples from cases of contagious or environmental mastitis will give a positive milk culture. In some cases, the milk culture will be negative, even when the milk is visibly abnormal. As long as the milk samples were properly collected and transported to the laboratory, even the negative culture result can provide useful information.

The results of bacterial culture should be considered along with other health information, such as individual animal SCC history, age, and stage of lactation — as well as the production requirements for the farm to decide on appropriate treatment and preventative measures. Occasionally, the culture will need to be repeated, or a special culture technique may be necessary to identify some types of microbes that cause mastitis.



Proper collection of the milk sample is essential to ensure a successful milk culture.

### 3.2.4.4 Recommended Procedure for Collecting Composite Milk Samples for Culture

1. Label outside of sterile milk sample vials with a waterproof marker.
2. Wash and dry hands — use disposable gloves.
3. Wash and dry teats as if preparing for milking or pre-dip teats, allowing up to 30 seconds of contact time before drying with individual towels.
4. Discard 2–3 streams of milk from each teat.
5. Scrub each teat end with an alcohol swab. Scrub the teats furthest away from you first, then the closest teats.
6. Allow a few seconds for the teat ends to dry.
7. Do not touch the inside of the vial or lid. Milk one stream from each teat into the vial. Collect milk from the closest teats first; then collect from the furthest teats.
8. Replace the lid on the vial.
9. Dip teats with an approved dip after collecting the sample.
10. Refrigerate the samples immediately. Check with the lab or your veterinarian to determine if samples should be frozen rather than refrigerated.
11. Pack milk samples so they remain chilled during transport.
12. Ensure the samples reach the laboratory as quickly as possible.

See Chapter 11 of the Troubleshooting Guide for additional information on interpreting information about mastitis from individual animals.

## 3.3 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                                                    | SOURCE                                                                                            | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHEMICAL</b>                                           |                                                                                                   |                                                                                                                                                                                                                                                                                                                         |
| Livestock medicine and chemical residues in meat and milk | <ul style="list-style-type: none"> <li>Any treatments with livestock medicines</li> </ul>         | <input type="checkbox"/> Identify all cattle according to National Livestock Identification (NLID) or Agri-Tracabilité Québec.<br><input type="checkbox"/> Identify all cattle (e.g. ear tag) so that treatment records can be maintained.<br><input type="checkbox"/> Buy residue-free animals from a reliable source. |
| <b>PHYSICAL</b>                                           |                                                                                                   |                                                                                                                                                                                                                                                                                                                         |
| Broken needles in meat                                    | <ul style="list-style-type: none"> <li>Any injectable treatment of livestock medicines</li> </ul> | <input type="checkbox"/> Buy animals from a reliable source that do not contain broken needles.                                                                                                                                                                                                                         |

## 4.0 MEDICINES AND CHEMICALS USED ON LIVESTOCK (BMP 4)

### Index:

|                                                  |
|--------------------------------------------------|
| Anatomy of a Livestock Medicine Label            |
| Storage and Handling                             |
| Treatment Choice                                 |
| Administration                                   |
| Identification of Treated Cattle                 |
| Records                                          |
| Summary of Hazards and Best Management Practices |



## Workbook Self-Evaluation Questions

### BMP 4 Medicines and Chemicals Used on Livestock

Access to a range of livestock medicines and vaccines helps Canadian dairy producers maintain the health and productivity of dairy cattle. All dairy producers produce beef as well as milk and access to livestock medicines carries with it a responsibility to ensure the products are stored and used so that the health and safety of treated animals and the safety of milk and meat are assured.

| Reference Manual Chapters 3, 4 |                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage and Handling           |                                                                                                                                                                         |
| 23.                            | Do you maintain a list of all medicines and chemicals that you use on livestock? (Record 9)                                                                             |
| 24.                            | Do you store medicines, chemicals used on livestock, syringes and needles in a clean and sanitary manner, in a dedicated place, according to label directions?          |
| 25.                            | Do you store and handle medicines and chemicals used on livestock in a manner that will not contaminate:                                                                |
|                                | • Milk?                                                                                                                                                                 |
|                                | • Meat?                                                                                                                                                                 |
|                                | • Feeds?                                                                                                                                                                |
| 26.                            | Do you store livestock medicines and chemicals for non-lactating and lactating dairy cattle, and products not intended for dairy cattle in separate areas or cupboards? |

## Reference Manual Chapters 3, 4

### Treatment Choice

|     |                                                                                                                                                                                                                            |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 27. | Do you use <b>only</b> livestock medicines (including medicated foot- baths):                                                                                                                                              |
|     | • Approved in Canada for use in dairy cattle?                                                                                                                                                                              |
|     | • According to the label?                                                                                                                                                                                                  |
|     | • According to written veterinary prescriptions, which must be available for every treatment administered not according to the label and for every veterinary drug used that is not approved for use in Canada? (Record 8) |

### Administration

|     |                                                                                                                                                   |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 28. | Do you check for and record the identity of any animal and treatment site whose treatment resulted in an irretrievable broken needle? (Record 11) |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------|

### Identification of Treated Cattle

|     |                                                                                                                            |
|-----|----------------------------------------------------------------------------------------------------------------------------|
| 29. | Do you mark all treated cattle in the milking herd that have milk withdrawals (e.g. leg bands)? <i>Specify type:</i> _____ |
|-----|----------------------------------------------------------------------------------------------------------------------------|

### Records

|     |                                                                                                                                                    |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 30. | Do you maintain a permanent written record of all medicines and chemicals used on livestock that have a milk or meat withdrawal? (Record 10)       |
| 31. | Have you established and implemented a Standard Operating Procedure for treating cattle? (Record 5)                                                |
| 32. | Do you keep a record of problems that have occurred following any treatments administered to animals and the corrective actions taken? (Record 17) |
| 33. | When administering medication by injection, do you use the subcutaneous route if the label permits it?                                             |
| 34. | When administering medications by injection in the muscle, do you give it in the neck muscles rather than the rump muscles?                        |

# Introduction

Access to a range of livestock medicines, vaccines and treatments helps Canadian dairy producers maintain the health and productivity of dairy cattle. Access carries with it a responsibility to ensure the products are stored and used so that the health and safety of treated animals, the producer and consumers are assured. Work with your herd veterinarian to evaluate your current livestock medicines usage.

Products commonly used as livestock medicines on dairy farms are:

- **Biological products:** (biologics) medicines obtained from animal or plant tissue. The biologics most commonly used on dairy farms are vaccines and immunoglobulin (antibody) preparations.
- **Pharmaceuticals:** medicines obtained by creating, mixing or compounding chemicals. Pharmaceuticals commonly used on dairy farms include antibiotics, corticosteroids, mastitis treatments, hormones, disinfectants and parasiticides.
- **Veterinary Natural Health Products (vNHPs):** alternatives to traditional medicines, these preparations are sourced from naturally occurring substances, usually plant based, and include homeopathic remedies.
- **Medical Devices:** instruments or compounds applied to cattle or placed in the udder that have a mechanical function but contain no active ingredients.

Drugs are identified by both their brand and generic names. The brand name is the distinctive name given to products by the manufacturer. The generic name refers to the active ingredient of the livestock medicine.

Drugs are regulated separately from feeds. The Canadian Food Inspection Agency is responsible for regulating feed for animals through the Feeds Act. Schedule IV of the Feeds Act lists all of the approved feeds for livestock. The list provides producers with a reference on which feeds they can freely provide to cattle and which feeds are excluded.

## 4.1 ANATOMY OF A LIVESTOCK MEDICINE LABEL

Reading the label and following its instructions are essential steps in the proper use of livestock medicines. All drugs legally marketed for sale in Canada must be labelled according to federal regulations. Sometimes there is not enough room on the label to legibly record all the information needed to use the product correctly, so the manufacturer will include additional information on a package insert. Figure 4 is an example of the information often on a drug package.

### 4.1.1 Label or Insert Information

The label or insert information will contain the following information (most numbers are illustrated in Figure 4):

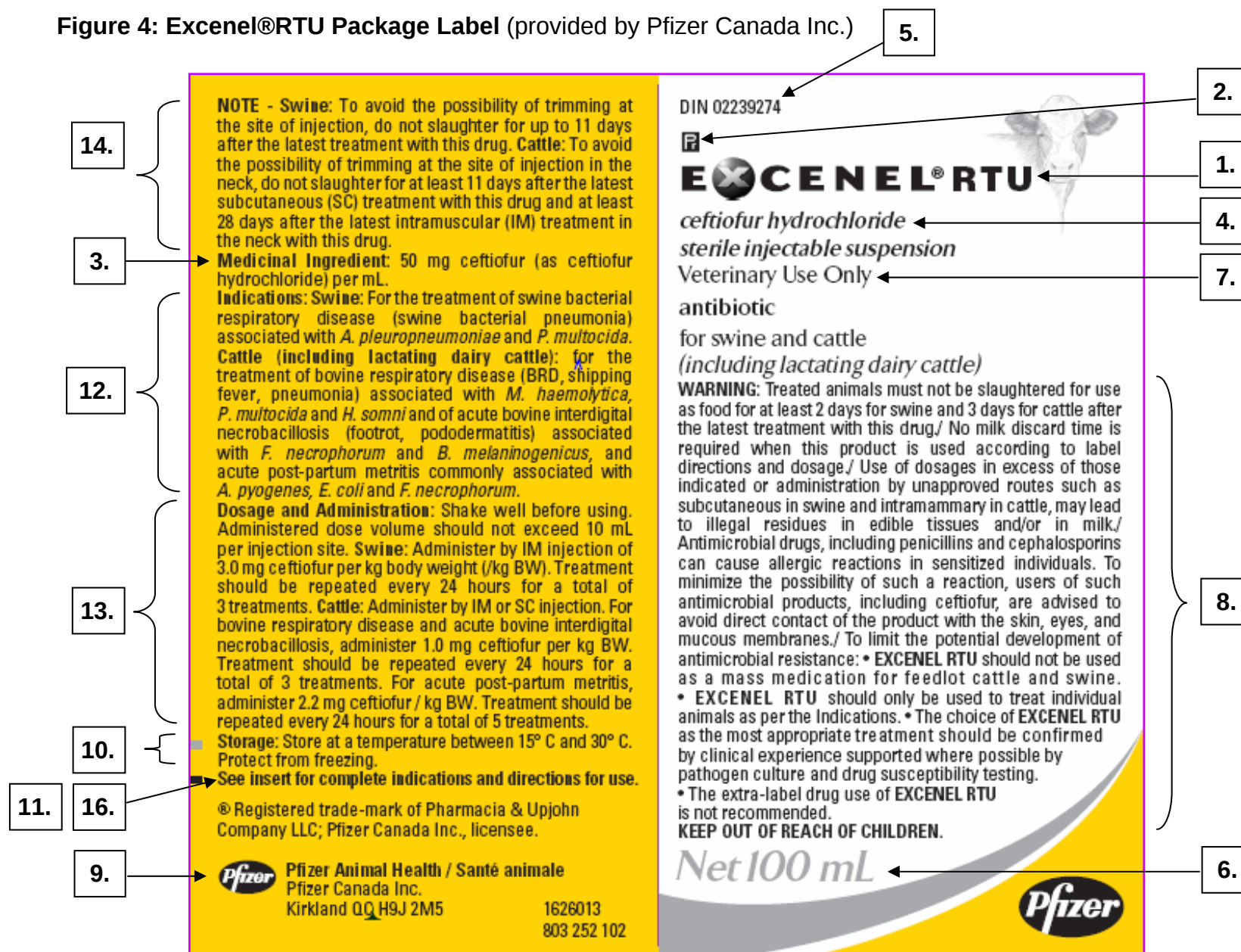
1. **Product or brand name** of the livestock medicine.
2. **Drug classification** (indicates if the drug is prescription or over-the-counter)
  - Written on the label immediately adjacent to the product name.
  - Prescription drugs are marked with the symbol **Pr**.
  - Over-the-counter drugs have no designation.
3. **Active ingredient**, which is the:
  - Generic name of the drug.
  - Portion of the product that performs the action claimed in the indications section of the label.
4. **Formulation**, which describes the:
  - Contents of the container such as liquid or powder.
  - **Intended method of use** of the product, e.g., a feed additive, intrauterine antibiotic or mastitis therapy.
5. **Drug identification number (DIN)**
  - Designates that the drug has been approved by the government.
  - Is the universal number used to identify the drug at any poison control centre.
6. **Net contents**, which is the volume if the drug is a fluid or weight if the drug is non-liquid.
7. **'Veterinary use only,'** indicates the drug is for use in animals, not humans.
8. **'Warning,'** which is a statement of:
  - Any risk to **human health** from the use of the product in animals.
  - **Withdrawal time** is stated in this section — the withdrawal time is only accurate when the product is used according to the instructions in the dosage and administration portion of the label.
  - Restrictions on use.
9. **Name and address of the manufacturer or distributor** of the product.

To ensure effective and safe use of the product, it must be used properly. The label or insert information will provide:

10. Recommendations on **storing** the product - livestock medicines stored other than according to label directions may lose effectiveness and in some cases may cause adverse reactions.
11. **Precautions**, which are statements related to storage, handling and disposal of the drug.
12. **Indications** for use, which list the species, class of livestock that can be treated with the product, and condition that the medicine is intended to treat.
13. **Directions for use**, including the
  - Dosage information, which indicates how much, how often and how long to treat with the product.
  - Route of administration of the product.

It is important to follow these directions for use because effectiveness and withdrawal time were determined for that use only.
14. **Cautions and contraindications**, which are warnings of adverse effects the product could cause in treated animals.
15. **Expiry date** - the date beyond which the product should not be used.
16. **Package insert** - is a statement on the label advising the user to read the insert for complete information. This means there was not enough space on the product label to include all information important to the proper use of the product.
17. **Lot or serial number** of the product - knowing the lot number is important, as it is often the only way of tracing the product if an adverse drug reaction occurs.

Figure 4: Excenel®RTU Package Label (provided by Pfizer Canada Inc.)



## 4.1.2 Dosage Calculations

Everyone treating animals must know how to follow labels and calculate dosages.

### Example 1:

Calculate the total amount of Excenel®RTU that should be given to a cow weighing 600 kg (1320 lb) that is diagnosed with respiratory disease or metritis. The dosing rate for Excenel®RTU is 1 ml for every 50 kg of body weight. Refer to the Excenel®RTU Package Label shown in Figure 4 to calculate how Excenel®RTU should be administered.

- The total dose for metritis to be given to a 600 kg cow is: \_\_\_\_\_
- The total dose for BRD to be given to a 600 kg cow is: \_\_\_\_\_
- How should it be administered: \_\_\_\_\_
- How often should this dose be repeated: \_\_\_\_\_
- How long before the milk can go in the bulk tank: \_\_\_\_\_
- How long before the treated animal can be shipped for meat: \_\_\_\_\_
- How should Excenel®RTU be stored?
- What is the active ingredient?

### Solutions:

- $600\text{kg} \times 2.2\text{ml}/50\text{kg} = 1320/50 = 26.4\text{ml}$
- $600\text{kg} \times 1\text{ml}/50\text{kg} = 600/50 = 12\text{ml}$
- Injected into the muscle or subcutaneously. Do not inject more than 10ml at one site.
- For metritis: every 24 hours for a total of 5 treatments. For BRD: every 24 hours for a total of 3 treatments.
- No milk withdrawal if used according to label directions and dosage
- 3 day meat withdrawal for cattle; however, the label suggests that treated cattle not be slaughtered for 11 days after subcutaneous injection and 28 days after intramuscular injection (see note at point 14)
- At a temperature between 15°C and 30°C. Protect from freezing.
- Ceftiofur (as ceftiofur hydrochloride)

### Example 2:

Calculate the total amount of Eprinex® that should be given to a heifer weighing 225 kg (500 lb). The dosing rate for Eprinex® is 1 ml for every 10 kg of body weight. Refer to the Eprinex® Package Insert shown in Figure 5.

- What is Eprinex® used for: \_\_\_\_\_
- The total dose to be given to a 225 kg heifer is: \_\_\_\_\_
- How should it be administered: \_\_\_\_\_
- How long before a heifer could be sold for beef: \_\_\_\_\_
- How should Eprinex® be stored: \_\_\_\_\_
- What warnings are important for people using the product: \_\_\_\_\_

Figure 5: Eprinex® Package Insert (Provided by Merial Canada Inc.)

## VETERINARY USE ONLY

# Eprinex®

## (eprinomectin)

### Pour-On for Beef and Dairy Cattle

For the treatment of parasitic infections due to gastrointestinal roundworms (including inhibited *Ostertagia ostertagi*), lungworms, cattle grubs, and infestations due to sucking and biting lice, chorioptic and sarcoptic mange mites and horn flies in beef and dairy cattle; and for the treatment of parasitic infections due to gastrointestinal roundworms and lungworms in deer.

**ACTIVE INGREDIENT:** Each mL contains 5 mg of eprinomectin.

#### NOTE TO USER

Consult your veterinarian for the diagnosis, treatment and control of parasitism in cattle and deer. For best results, EPRINEX Pour-On should be used in a planned program to control both internal and external parasites.

#### INTRODUCTION

EPRINEX Pour-On delivers highly effective internal and external parasite control in one low-volume application. EPRINEX Pour-On contains the active ingredient, eprinomectin, a unique chemical entity. Its convenience, broad-spectrum efficacy in a weatherproof formulation, wide margin of safety, zero meat withdrawal and zero milk discard make it an excellent product for parasite control in beef cattle, dairy cattle (including lactating dairy cows) and deer.

#### PRODUCT DESCRIPTION

EPRINEX Pour-On for Beef and Dairy Cattle is a clear, colorless liquid, containing 5 mg of eprinomectin per mL. It is formulated to deliver the recommended dose level of 500 µg of eprinomectin per kg of body weight in target animals, when applied along the backline from the withers to the tail head, at the rate of 1 mL per 10 kg body weight.

#### EPRINOMECTIN

The active ingredient, eprinomectin, is an antiparasitic agent from the macrocyclic lactone family of compounds.

#### INDICATIONS

##### 1. BEEF and DAIRY CATTLE

EPRINEX Pour-On is indicated for the treatment of parasitic infections and infestations due to the following gastrointestinal roundworms, lungworms, grubs, sucking and biting lice, mange mites and horn flies in beef and dairy cattle (including lactating dairy cattle):

| Parasites                          | Adults | L4 | Inhibited L4 |
|------------------------------------|--------|----|--------------|
| <b>Gastrointestinal roundworms</b> |        |    |              |
| <i>Ostertagia ostertagi</i>        | •      | •  | •            |
| <i>O. lyrata</i>                   | •      |    |              |
| <i>Haemonchus placei</i>           | •      | •  |              |
| <i>Trichostrongylus axei</i>       | •      | •  |              |
| <i>T. colubriformis</i>            | •      | •  |              |
| <i>T. longispicularis</i>          | •      |    |              |
| <i>Cooperia oncophora</i>          | •      | •  | •            |
| <i>C. punctata</i>                 | •      | •  | •            |
| <i>C. pectinata</i>                | •      | •  | •            |
| <i>C. surnabada</i> (mcmasteri)    | •      | •  | •            |
| <i>Nematodirus helvetianus</i>     | •      | •  |              |
| <i>Oesophagostomum radiatum</i>    | •      | •  |              |
| <i>Trichuris ovis</i>              | •      |    |              |
| <i>T. discolor</i>                 | •      |    |              |
| <i>Bunostomum phlebotomum</i>      | •      | •  |              |
| <i>Strongyloides papillosus</i>    | •      |    |              |
| <b>Lungworms</b>                   |        |    |              |
| <i>Dictyocaulus viviparus</i>      | •      | •  |              |

#### ADMINISTRATION

EPRINEX Pour-On is formulated for external use in beef cattle, dairy cattle and deer. The formulation should be applied along the backline, in a narrow strip extending from the withers to the tail head, at a dose volume of 1 mL per 10 kg of body weight, to achieve a dose level of 500 µg of eprinomectin per kg of body weight.

#### Squeeze-Measure-Pour System (250 mL and 1 L bottles)

Attach the metering cup to the bottle. Set the dose by turning the top section of the cup to align the correct body weight with the pointer on the knurled cap. When body weight is between markings, use the higher setting. Hold the bottle upright and squeeze it to deliver a slight excess of the required dose as indicated by the calibration lines. By releasing the pressure, the dose automatically adjusts to the correct level. Tilt the bottle to deliver the dose. For the 1 liter bottle, when a 100 kg (10 mL) or 150 kg (15 mL) dose is required, turn the pointer to "stop" before delivering the dose. The off (stop) position will close the system between dosing. Bottles should remain upright during storage.

#### Collapsible Pack (2.5 L and 5 L packs)

Connect the dosing applicator and draw-off tubing to the collapsible pack as follows: (1) Attach the open end of the draw-off tubing to an appropriate dosing applicator. (2) Attach the open end of the draw-off tubing to the dosing applicator and attach draw-off tubing to the self-venting cap with the stem. (3) Replace the shipping cap with the self-venting cap which has the stem and tighten this cap. (4) Invert the pack and gently prime the dosing applicator, checking for leaks. (5) Follow the dosing applicator manufacturer's directions for adjusting the dose, proper use and maintenance of the dosing applicator and draw-off tubing.

#### MODE OF ACTION

Eprinomectin is a member of the macrocyclic lactone class of endectocides which have a unique mode of action. Compounds of the class bind selectively and with high affinity to glutamate-gated chloride ion channels which occur in invertebrate nerve and muscle cells. This leads to an increase in the permeability of the cell membrane to chloride ions with hyperpolarization of the nerve or muscle cell, resulting in paralysis and death of the parasite. Compounds of this class may also interact with other ligand-gated chloride channels, such as those gated by the neurotransmitter gamma-aminobutyric acid (GABA).

The margin of safety for compounds of this class is attributable to the fact that mammals do not have glutamate-gated chloride channels; the macrocyclic lactones have a low affinity for other mammalian ligand-gated chloride channels and they do not readily cross the blood-brain barrier.

#### NOTE TO USER

Rainfall anytime before or after treatment will not affect the efficacy of the product.

#### SAFETY

Studies have demonstrated a wide safety margin in target animals. Three times the recommended dose level had no adverse effect on breeding performance of cows or bulls. Treatment at five times the recommended therapeutic dose had no adverse effect on deer.

#### ENVIRONMENTAL SAFETY

Studies indicate that when eprinomectin comes in contact with the soil, it readily and tightly binds to the soil and becomes inactive. Drug containers and any residual contents should be disposed of safely (e.g. by burying or incinerating) as free eprinomectin may adversely affect fish and certain aquatic organisms.

#### WARNING

1. Keep this and all drugs out of the reach of children.
2. Avoid contact with skin and eyes. If accidental skin contact occurs, wash the affected area immediately with soap and water. If accidental eye exposure occurs, flush eyes immediately with water.

#### NOTE TO USER

- (1) When used according to label directions, no meat withdrawal time is required following the use of EPRINEX Pour-On on beef cattle, dairy cattle and deer.
- (2) When used according to label directions, no milk withholding time is required following the use of EPRINEX Pour-On on dairy cattle.

#### CAUTION

1. For topical application only: do not administer orally or by injection.
2. Do not apply to areas of the backline covered with mud or manure.
3. To prevent potential secondary reactions when treating infections with cattle grubs, consult your veterinarian on the correct timing of treatment.
4. No data are available on the effect of this product on the breeding performance of male and female deer.

#### STABILITY

EPRINEX Pour-On is stable for 36 months when stored under normal conditions.

#### STORAGE

Store bottle or pack in carton to protect from light.

## Cattle grubs (internal parasitic stages)

*Hypoderma bovis*  
*H. lineatum*

## Biting and sucking lice

*Damalinia bovis*  
*Linognathus vituli*  
*Haematopinus eurysternus*  
*Solenopotes capillatus*

## Mange mites

*Chorioptes bovis*  
*Sarcoptes scabiei* var *bovis*

## Horn flies

*Haematobia irritans*

EPRINEX Pour-On administered at the recommended dosage of 500 µg of eprinomectin per kg of body weight, effectively controls parasitic infestations with *Haematobia irritans* (horn flies) for up to 7 days after treatment. For optimal control of horn flies, EPRINEX should be used as part of an integrated control program. Consult your veterinarian for the most effective timing of applications.

## PERSISTENT ACTIVITY

EPRINEX Pour-On administered at the recommended dosage of 500 µg of eprinomectin per kg of body weight, effectively controls parasitic infections with *Ostertagia ostertagi*, *Nematodirus helvetianus*, and *Dictyocaulus viviparus* for 28 days after treatment, *Cooperia oncophora*, *C. punctata* and *C. surnabada* (mcmasteri) for 21 days after treatment and *Haemonchus placei*, *Trichostrongylus axei*, *T. colubriformis* and *Oesophagostomum radiatum* for 14 days after treatment.

## 2. DEER

EPRINEX Pour-on is indicated for the treatment of parasitic infections due to the following gastrointestinal roundworms and lungworms in deer:

| Parasites                                                                                                                                              | Adults | L4 | Inhibited L4 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|--------------|
| <b>Gastrointestinal roundworms</b>                                                                                                                     |        |    |              |
| <i>Ostertagia</i> -like spp*.                                                                                                                          | •      |    |              |
| <i>Trichostrongylus</i> spp.                                                                                                                           | •      | •  |              |
| <i>Oesophagostomum</i> spp.                                                                                                                            | •      |    |              |
| <i>Mazamastrongylus</i> spp.                                                                                                                           | •      |    |              |
| <b>Lungworms</b>                                                                                                                                       |        |    |              |
| <i>Dictyocaulus viviparus</i>                                                                                                                          | •      | •  |              |
| *(Includes <i>O. mossi/dikmansii</i> , <i>O. lyrata</i> , <i>O. leptosporicaris</i> , <i>Spiculopteratia spiculoptera</i> and <i>S. asymmetrica</i> .) |        |    |              |

## PACKAGING

EPRINEX Pour-On for beef cattle and dairy cattle, is available in four ready to use sizes: 250 mL, 1 L, 2.5 L and 5 L, DIN 02237228.

250 mL - Product H30250CA, is supplied in a multiple-dose bottle with metering cup. Each bottle contains enough solution to treat 10 x 250 kg of body weight (one mL per 10 kg).

1 L - Product H30251CA, is supplied in a multiple-dose bottle with metering cup. Each pack contains enough solution to treat 40 x 250 kg of body weight (one mL per 10 kg).

2.5 L - Product H30252CA, is supplied in a soft, collapsible pack including a self-venting draw-off assembly, designed for use with automatic dosing equipment. Each pack contains enough solution to treat 100 x 250 kg of body weight (one mL per 10 kg).

5 L - Product H30253CA, is supplied in a soft, collapsible pack including a self-venting draw-off assembly, designed for use with automatic dosing equipment. Each pack contains enough solution to treat 200 x 250 kg of body weight (one mL per 10 kg).

Merial Canada Inc.  
20000 Clark Graham  
Baie d'Urfé, Qc, H9X 4B6

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2050-2504-00



## Solutions:

- Treatment of parasitic infections of cattle.
- $225\text{kg} \times 1\text{ml}/10\text{ kg} = 225/10 = 22.5\text{ml}$
- Poured along the backline
- No meat withdrawal
- Protected from light
- Keep out of reach of children and avoid contact with skin and eyes

Figure 6: Cefa-Dri® Package Label (Provided by Boehringer Ingelheim (Canada) Ltd)



DIN 02173255

**FOR VETERINARY USE ONLY**  
**POUR USAGE VÉTÉRINAIRE SEULEMENT**

**CEPHAPIRIN**  
**BENZATHINE**



**BENZATHINE**  
**CÉPHAPIRINE**

**INTRAMAMMARY INFUSION**  
**(DRY COWS)**

**POUR USAGE INTRAMAMMAIRE**  
**(VACHES TARIÉES)**

Active Ingredient: Each 10 mL syringe contains 300 mg of cephalixin activity as cephalixin benzathine.

**READ PACKAGE INSERT.**

**STORAGE:** Store at controlled room temperature 15° to 30°C; avoid excessive heat.

**WARNING:** For use in dry cows only. Not to be used within 30 days of calving. Milk from treated cows must not be used as food during the first 84 hours after calving. Any animal infused with this product must not be slaughtered for food until 42 days after the latest infusion. Peanut Allergy Warning: This product contains peanut oil.

**KEEP OUT OF REACH OF CHILDREN**

Ingrédient actif: Chaque seringue de 10 mL renferme 300 mg de céphalexine active sous forme de benzathine céphalexine.

**CONSULTER LE DÉPLIANT DE CONDITIONNEMENT.**

**ENTREPOSAGE:** Conserver à une température ambiante contrôlée, entre 15° et 30°C. Éviter toute chaleur excessive.

**MISE EN GARDE :** N'utiliser que chez les vaches tarées. Ne pas utiliser dans les 30 jours précédant la mise bas. Le lait provenant des vaches traitées ne doit pas être utilisé à des fins alimentaires dans les 84 heures suivant la mise bas. Les animaux ayant reçu une perfusion de ce produit ne doivent pas être abattus à des fins alimentaires dans un délai d'au moins 42 jours après la dernière perfusion. Mise en garde contre l'allergie aux arachides: Ce produit contient de l'huile d'arachide.

**GARDER HORS DE LA PORTÉE DES ENFANTS**

**Net Contents / Contenu net**  
**10 mL**

Wyeth Animal Health  
Division of Wyeth Canada  
Guelph, Ontario N1K 1E4  
Trademarks used under license



Wyeth Santé animale  
Division de Wyeth Canada  
Guelph, Ontario N1K 1E4  
Marques de commerce  
utilisées sous permis

03083

C42211

### Example 3:

Using the Cefa-Dri® Package Label answer the following questions:

- a) What is the milk withdrawal time if this product is use according to the label: \_\_\_\_\_
- b) What is the meat withdrawal time: \_\_\_\_\_
- c) Are there any special warnings associated with this product's use: \_\_\_\_\_

#### Solutions:

- a) 84 hours after calving
- b) 42 days after last treatment
- c) Product must not be used within 30 days of calving.

### Example 4:

Using the Jencine® ERC Package Label and Package Insert answer the following question:

- a) Are there any withdrawal times associated with use of this vaccine?

**Solution:** a) The label does not include a “Caution” section; however, the label insert does and it states “do not vaccinate within 60 days prior to slaughter.”

**Figure 7: Jencine® ERC Package Label and Package Insert** (Provided by Schering-Plough Animal Health)

**Bovine Rotavirus- Coronavirus Vaccine, Killed Virus, *Clostridium perfringens* Types C & D- *Escherichia coli* Bacterin-Toxoid**

Vaccin contre le rotavirus et le coronavirus bovins, virus tués, *Clostridium perfringens* de types C et D, *Escherichia coli*, Bactérine-anatoxine



**DOSAGE:** Using aseptic technique, inject healthy pregnant cattle with 2 mL **subcutaneously** 3 months prior to calving. Repeat in 3 - 6 weeks following initial vaccination. For subsequent calvings, revaccinate with a single 2 mL dose 5 - 7 weeks before calving. **Store between 2° and 7°C. Do not freeze.**

**POSOLOGIE:** Dans des conditions d'asepsie, injecter par voie *sous-cutanée* 2 mL à la femelle gravide en santé 3 mois avant le vêlage. Répéter l'administration de 3 à 6 semaines après la vaccination initiale. Pour les vêlages subséquents, revacciner avec une seule dose de 2 mL de 5 à 7 semaines avant le vêlage. **Garder entre 2 et 7 °C. Éviter le gel.**

Manufactured by/  
Fabriqué par :  
Schering-Plough Animal Health Corporation  
Omaha, Nebraska  
68103 USA/É.-U.  
U.S. Veterinary License No. 165A/ Permis vétérinaire américain n° 165A  
Manufactured for/  
Fabriqué pour :  
Schering Canada Inc.  
Pointe-Claire, Québec H9R 1B4  
1 888 306-0069 (Canada)

05-0013LBL  
P14519-10



FOR VETERINARY USE ONLY/ POUR USAGE VÉTÉRINAIRE SEULEMENT

**JENCINE® ERC**

**50 Doses 100 mL**



Schering-Plough Animal Health/Santé Animale  
Division of/de **SCHERING CANADA INC.**

**Bovine Rotavirus-Coronavirus Vaccine, Killed Virus, *Clostridium Perfringens* Types C & D-*Escherichia Coli* Bacterin-Toxoid**

Jencine® ERC vaccine is a multiple antigen product which includes a cell-free extract of K99 pilus type of *Escherichia coli*, a unique combination of two inactivated coronaviruses, two G-types of inactivated rotaviruses and a bacterin-toxoid from *Clostridium perfringens* Types C and D. It is recommended for use in healthy heifers and cows as an aid in the prevention of neonatal calf diarrhea caused by enterotoxigenic *E. coli* pilus type K99 and bovine Group A Serotype G6 rotaviruses, enterotoxemia caused by *C. perfringens* Types C and D, and as an aid in the control of neonatal calf diarrhea caused by bovine coronaviruses.

**DOSAGE:** Using aseptic technique, inject healthy pregnant cattle with 2 mL **subcutaneously** 3 months prior to calving. Repeat in 3 - 6 weeks following initial vaccination. For subsequent calvings, revaccinate with a single 2 mL dose 5 - 7 weeks before calving.

**CAUTION:** For veterinary use only. Store at 2° to 7°C (35° to 45°F). Do not freeze. Shake well before use. Use entire contents when first opened. Do not vaccinate within 60 days prior to slaughter. Transient local reaction may occur at the injection site. If allergic response occurs, administer epinephrine.

**PRESERVATIVES:**  
Gentamicin and thimerosal.

Manufactured by:  
Schering-Plough  
Animal Health Corporation  
Omaha, Nebraska 68103 USA  
U.S. Veterinary License No. 165A

Manufactured for:  
Schering Canada Inc.  
Pointe-Claire, Québec H9R 1B4  
1 888 306-0069 (Canada)

## 4.2 STORAGE AND HANDLING

Livestock medicines will maintain their potency, safety and shelf life only if they are stored properly. This is equally true for storage before and after purchase, and during transportation. Consider this when purchasing livestock medicines that have specific storage requirements.



Livestock medicines can be sensitive to temperature, light and humidity. Where appropriate, special storage conditions will appear in the **Precaution(s)** section of the label or insert. These conditions are necessary to maintain the product's safety and effectiveness. The expiry date will only apply if products are stored according to the instructions stated on the label.

There may be special storage instructions for opened or partially used products. Products that are combined or mixed before use will only maintain their safety or potency for a limited time and only if stored under appropriate conditions. Refrigeration after opening may be indicated for all injectable products. Read and follow label for proper storage and disposal instructions.

Medicines must also be stored in areas that eliminate the risk of contamination of milk, meat or feed. For example, medicines should not be left or stored where cattle can access them and accidentally ingest or absorb products.

### 4.2.1 Storing and Handling Livestock Medicines

- ✓ Create a list or catalogue of all medicines and chemicals used on livestock including product name and storage location. All products that are to be used on or in cattle on the farm should be listed, including all medicines, chemicals (e.g. pesticides), specially prepared products (e.g. prescription salves, udder balms or sprays), all medicated feeds fed to cattle, and teat dips or sprays. The list is not intended to be a rolling inventory; therefore, you do not have to record every bottle if you have more than one bottle of one type of medicine. The purpose of the list is to ensure that everyone using or handling livestock medicines and chemicals is aware of the contents of the label. See the Workbook for a sample record (Record 9).
- ✓ Store livestock medicines in a clean and sanitary manner, according to label directions and, to reduce the risk that milk and meat will become contaminated, in an appropriate facility such as:
  - Operating refrigerator (2° C to 7° C) reserved for storage of livestock medicines or in a sealed container in a refrigerator. Producers should regularly check the temperature in refrigerators to ensure that they are operating in the correct range.
  - Cupboard or container that is clean, dust-free, dry, cool but frost-free and protected from light - should also be protected from children, animals and insects.

Livestock medicine labels must be intact and readable. Medicines must be in their

original containers. Any drugs dispensed for treatment not in the original container must be properly identified with the treatment usage, withdrawals and storage directions, and packaged in a manner that maintains the integrity of the product. A producer can store medicines and chemicals used on livestock in a manner outside of label directions ONLY if the producer has a prescription from a veterinarian stating the different storage conditions.

- ✓ Store syringes and needles in a clean and sanitary manner and away from livestock access.
- ✓ Store livestock medicines away from feeding areas, milk and milking equipment.

**All veterinary drugs stored in the milk house or parlour must be kept in a closed, cleanable storage unit or refrigerator, where appropriate, in a manner that prevents contamination of milk. Furthermore, pesticides or toxic chemicals must not be stored in the milk house unless they are directly related to its operation.**

Medicines may be stored temporarily in the parlour if they are intended to be used during the next milking and the producer can identify which animal is going to be treated.

- ✓ Have separate storage areas or facilities for livestock medicines and chemicals intended for use in non-lactating and lactating dairy cattle and products not intended for dairy cattle (i.e. for other animals such as chickens and dogs). If all of these types of products are stored in the same cupboard, they should be at least in separate sections or shelves and distinctly identified. As a result, a producer may have three storage areas for medicines: 1) lactating cattle; 2) dry cattle and young stock; and 3) beef cattle, sheep and other species of animals.
- ✓ Pesticides labelled for cattle can be stored in the same area as livestock medicines but they must be separated from and stored below livestock medicines to reduce the risk of contaminating livestock medicines should the pesticides leak or spill.
- ✓ Pesticides, cleaners and other substances that are not for use on or in cattle must not be stored with livestock medicines and chemicals. They must be stored separately (e.g. another cupboard or different shelves).
- ✓ Expired products must be disposed of properly or stored separately from non-expired drugs to ensure that expired products are not inadvertently used to treat an animal.
- ✓ Check the expiry date on all livestock medicines before purchase.
- ✓ Purchase enough products for use in a timely manner only.
- ✓ Use product with the closest expiry date first.
- ✓ Discard expired products.
- ✓ Dispose products properly to ensure that cattle cannot access containers. Some products may have special disposal requirements.
- ✓ Transport livestock medicines under the same conditions required for storage.
- ✓ Keep an up-to-date file of product packages and inserts to allow rechecking of label

**Many chemicals used in pre-milking preparation and post-milking sanitation also have special storage requirements to maintain their potency and safety. These conditions are stated on the Precaution(s) section of the label or insert.**

instructions.

- ✓ Consider purchasing a copy of *The Compendium of Veterinary Products*, which contains label and insert information for all veterinary drugs and biologics registered for use in Canada.

## 4.2.2 Storing and Handling Multiple-Dose Vials of Livestock Medicines

Even if there are no special instructions, it is essential to prevent the product from becoming contaminated during use. Whenever multi-dose vials are used, take precautions to reduce the chances of the vial becoming contaminated during use.

- ✓ Do not store the bottle with a needle in the rubber stopper.
- ✓ Use sterile needles to fill syringes from the vial.
- ✓ Store bottles where the top will not become contaminated.
- ✓ Swab the top of the bottle with alcohol before use, except when mixing or withdrawing from bottle of live vaccines.
- ✓ Finish the bottle within a reasonable time after opening it. Some livestock medicines that are prepared for use by adding a solution such as sterile water to a dry powder must be used up within a time that is specified on the label.
- ✓ If recommended on the label, refrigerate the bottle after opening.
- ✓ Dispose of products properly.

## 4.3 TREATMENT CHOICE

Choosing the correct drug, injection site, and dosage to treat a particular disease is important for effective drug usage and health management. Proper and prudent use of drugs will ensure that producers treat animals correctly, and do not contribute to antimicrobial resistance. Treatment decisions should be made in conjunction with a veterinarian.

### 4.3.1 General Use of Livestock Medicines and Chemicals

Some of the Best Management Practices for correctly choosing treatments follow:

- ✓ **Read and follow label directions** to determine proper dosage and ensure livestock medicines are administered properly. Some products must be administered in one particular site or by one particular method.
- ✓ **Use products approved in Canada for use in dairy cattle**, or obtain a veterinary prescription to use veterinary drugs on dairy cattle that are not approved in Canada or are only approved for use in beef cattle or in other species, or use products listed in **Section 5** of the Permitted Substances Lists for Livestock Production (CAN/CGSB-32.311-2006) according to the specifications indicated (e.g. hydrogen peroxide: only food grade quality, can be used for external use as a disinfectant and it can be added to livestock drinking water as a disinfectant). Any product on the Permitted Substances Lists used in a manner that is not described on the Permitted

Substances Lists needs a veterinary prescription.

- ✓ **Obtain and have available a written veterinary prescription for all treatments given extra-label and for all veterinary drugs used that are not approved for use in Canada.** The prescription must detail the dosage and withdrawal times for milk and meat. A veterinarian may be able to write blanket prescriptions for commonly used extra-label drug usages. See the next section for more details.

**Please note:** In Quebec, all medications administered to dairy animals must be accompanied by a written veterinary prescription.

- ✓ **Monitor and use only registered (i.e. approved) pesticide treatments for control of internal and external parasites.**

- Check that pesticides for parasites and biting flies are registered for the type of animal being treated.
- Follow all label directions.
- Ensure that oilers and other delivery equipment are working properly.

### 4.3.2 Extra-label Use of Livestock Medicines and Chemicals

Extra-label drug use is any use of a product in any manner that is different from the instructions given on the label or package insert. Extra-label drug use poses two kinds of risk. The first is to the health and safety of the animal being treated; the second, in the case of food-producing animals, is to the food supply.

**The withdrawal times stated on the label only apply when the product is used exactly as stated on the label.** When products are used extra-label, withdrawal times must be adjusted. The new withdrawal time is an estimate of the amount of time it will take for drug residues to clear the animal's body.

Here are some examples of extra-label drug use:

- Using a dose different from the dose on the label, such as giving 3 ml/kg if the label says to use 1 ml/kg.
- Using a different frequency, e.g. twice per day, if once daily is recommended on the label.
- Using for a longer or shorter time than recommended.
- Administering by a different route, e.g., giving a product under the skin (subcutaneous) when the label states the drug should only be administered in the muscle (intramuscular).
- Administering to a different species or class of livestock, e.g., using products intended for swine to treat cattle or using products intended for feedlot cattle to treat lactating dairy cattle.
- Using the product to treat a disease not listed in the indications section of the label.
- Using one drug in combination with other drugs. This means not only that drugs should not be mixed, but also that you may not treat with two different drugs at the same time, even if each

Only products approved by federal or provincial regulations for administration to dairy cattle as set out on the product label may be administered to dairy cattle.

There are several drugs that can never be used to treat food-producing animals, even under a veterinarian's supervision. Drugs currently in this group are chloramphenicol, clenbuterol, diethylstilbesterol (DES) and nitrofurans.

drug was itself given according to the label.

- Using an unapproved vNHP without a veterinary prescription.

Under federal regulations, producers are **legally obliged** to follow the exact instructions included on the product label and insert. Producers can use drugs in an **extra-label manner only under the direct supervision of a veterinarian**. This condition applies to both over-the-counter and prescription drugs, even if the drug to be used was not purchased from a veterinarian, e.g. a livestock medicines outlet.

Licensed veterinarians are permitted to dispense livestock medicines and recommend extra-label usage, but they can do so only under certain conditions. When prescribing extra-label use of a drug, the veterinarian assumes responsibility for any damages and adverse reactions that might occur as a result of the extra-label use. **In many provinces, and with this program, the veterinarian is required to provide written instructions on the use of the livestock medicine, including appropriate withdrawal times.**

***Please note:** In Quebec, all medications administered to dairy animals must be accompanied by a written veterinary prescription.*

## 4.4 ADMINISTRATION OF TREATMENTS

### 4.4.1 Administering Injections

- ✓ **Record the identity of any animals carrying broken needles and record the site of injection.** Have a veterinarian find and remove the needles, or, if this is not possible, inform the packing plant or next buyer of contaminated animals. This will reduce the risk of contaminated meat becoming human food.
- ✓ **When given the choice on the label, give livestock medicines under the skin (subcutaneously)** rather than in the muscle. If intramuscular injection is necessary, using proper injection techniques will reduce the possibility of damaging the muscle, and increase the chances treatment will be successful.
- ✓ **Use the side of the neck (preferred site) for injections** into muscle. Using this site greatly reduces the chances of damaging the more valuable rump cuts of meat. The same site can be used for giving injections to both calves and adult cattle.
- ✓ **Properly identify the injection site**, by identifying the neck bones that run roughly along a line between the base of the ear and the point of the shoulder. If you stay above this line and the width of your hand below the crest of the neck, you can safely inject into the large neck muscles. Start two to three inches ahead of the shoulder blade. If you move one hand's-width closer to the head, you can give another injection on the same side. You can use both sides of the neck.
- ✓ **Use clean, sharp needles** when giving injections into muscle to prevent bruising and tearing of muscle fibres at the injection site and to reduce the risk of needle breakage in muscle tissue.
  - Ideally use a new single use needle for each injection.

- If needles are reused, do not use a needle more than 10 times.
- Change needles if they get dull or dirty.
- Never use a needle that has been bent.
- ✓ **Use needles** that can be easily detected at the processing plant.
- ✓ **Ensure needle is the correct size.** Using properly sized needles will reduce the pain and muscle damage caused by using large needles and will reduce the risk that a needle will break off during the injection because the needle was too small.  
Specifically for:
  - Subcutaneous injections, use 1 inch (2.5 cm) – 16 gauge needles.
  - Injections into muscle, use 1-1.5 inch (2.5 – 4 cm) – 16 gauge needles.
- ✓ **Restrain animal.** This will reduce the risk of injury both to the animal and to the person giving the injection, and will reduce the risk of breaking the needle.
- ✓ **Inject into proper site.** This will prevent damage to primal cuts and restrict damage to less valuable muscles.
  - For **intramuscular** injections, use the muscle on the side of the neck rather than the hip.
  - For **subcutaneous** injections, it is important to reduce the risk of inadvertently giving an injection in the muscle rather than under the skin. Use an area where it is easy to create a tent of skin. Specifically:
    - Use the skin over the side of the neck or over the chest behind the shoulder.
    - Create a tent by lifting a fold of skin.
    - Slide the needle in the base or 'door' of the tent.
- ✓ **Limit volume injected at each site.** When large volumes are given at one site, tissue can become irritated and the rate of uptake is slowed. Do not give more than 10-15 ml in one place.

### 4.4.2 Administering Intramammary Infusions *(based on procedures recommended by the National Mastitis Council)*

When treating animals with intramammary infusions, there is a risk that microbes could be carried past the normal teat defenses and into the udder. Using proper hygiene and proper infusion procedures will reduce the risk of contaminating the udder. Some livestock medicines that are administered into the udder have specific instructions on how to administer them printed on the label or package insert. Follow those instructions when administering those products. The following is a general description for administering intramammary preparations:

- ✓ Ensure teats are cleaned and dried.
- ✓ Use only products approved for intramammary infusion to treat the udder.
- ✓ Prepare the udder for milking as usual and completely milk it out.
- ✓ Dip teats in an approved pre-dip and ensure at least 30 seconds contact time before wiping teats with an individual towel.
- ✓ Clean and disinfect teat end by scrubbing with a swab or cotton ball soaked with

70% alcohol. Use a new swab or cotton ball for each teat. If you are treating all teats, scrub the teat ends on the far side of the udder first, and then scrub teats on the near side.

- ✓ Treat teats on the near side first, and then treat those on the far side.
- ✓ Use a mastitis treatment with a short infusion cannula or insert only the tip (3 millimetres) of a long cannula. Be careful the cannula does not touch anything until it is inserted into the teat end.
- ✓ Slowly infuse antibiotic preparation into the quarter.
- ✓ Dip teats after treatment.

### 4.4.3 Feeding Medicated Feed

Producers that feed medicated feed must establish an SOP for feeding medicated feed. The same Best Management Practices that apply to livestock treatments, such as antibiotics, apply to medicated feeds. Medicated feeds must also be included on the List of Medicines and Chemicals Used for Livestock (Record 9).

**See Chapter 2 for more information on feeding medicated feed.**

## 4.5 IDENTIFICATION OF TREATED CATTLE

Even when a treated animal's identification is recorded, it is essential in a valid HACCP-based on-farm food safety program to also **mark animals** in the milking herd that have been treated with animal health products that have a milk withdrawal. Proper marking ensures that milking personnel know which animals have been treated and when milk from each animal is safe to be placed in the bulk tank. This further reduces the chance of shipping an animal or its milk before the appropriate withdrawal period; thereby, reducing the risk that contaminated milk could become human food.

Dry cows must be marked if they have been treated with a product that has a milk withdrawal and there is a risk that the dry cows can accidentally be mixed with or enter the milking herd. For example, if there is only a gate separating lactating and dry groups and the gate could accidentally be left open, treated dry cows must be marked. It is also unacceptable to have dry cows housed on the milking line in a tie stall barn without any indication that they are treated.

Some methods for marking treated animals are:

- Leg bands.
- Coloured tape (surveyor's tape, hockey tape, duct tape) around legs or tail.
- Paint or stock crayon markings on the animal's flank, rump, legs or udder.
- In tie-stall barns, a marker placed on the milk or vacuum line in stalls occupied by treated animals plus the individual animals must be marked as being treated.
- In free-stall barns, creating a separate treated group (no risk of mixing with non-

treated animals) and milking treated animals last or with separate equipment.

- In computerized milking systems, the program may allow recording of a treated animal's identification and the withdrawal dates, but animals must still be marked as being treated. If your computerized system permits milking of an animal if it has been incorrectly identified or recognized by the reader, you must have a secondary identification system for marking treated animals.
- After treating, immediately transporting treated dry cows to another facility.
- Keeping groups of treated animals together after treatment and clearly marking the pen (no risk of mixing with non-treated animals) - keep a record of each individual animal's identification.
- Placing a message or bulletin board where it is easily visible at milking or in the barn when moving cattle, and ensuring individual animals are marked. Use it to display information about treated animals, their identity and when it is appropriate to return their milk to the bulk tank. Also, record the date on the board so people know the information is current.

## 4.6 RECORDS

As a user of livestock medicine, you are responsible for assuring that food produced on the farm is wholesome and safe. Any time a food-producing animal is treated with a livestock medicine; there is a risk that residues of the drug could enter the food supply.

### 4.6.1 Treatment Records

Dairy producers must be especially vigilant because they produce both beef and milk on their farms. **You must identify treated animals and maintain permanent written records of all veterinary drug use, particularly those that have a milk or meat withdrawal.**

- ✓ **Record the treatment and the appropriate withdrawal or "safe to ship" date for both milk and meat.** See Workbook, Chapter C for example record. Permanent treatment records can take many different forms. Computers are excellent tools, as long as staff have access to the information when they need to decide if milk or animals can be shipped. Paper records can also take many forms, for example tables or journals. Whichever method of recording you choose, you must have permanent records that contain the following information (see Records 10 and 11):

- Animals' identification.
- Treatment administered (product, dosage, mode of treatment).
- Date(s) of treatment(s).
- Withdrawal times for milk and meat - the label withdrawal only applies if all other label instructions are followed.
- Date when animal and milk is suitable for marketing.
- Broken needles – animal identification and location of irretrievable broken needle in the animal (Record 11).
- Valid expiry date at time of treatment – an expired product can become

unstable and result in higher concentrations of antibiotic being injected into an animal.

- Signature or initials of the person treating.

When veterinarians administer an extra label treatment to an animal on the farm, the following options are acceptable:

- 1) Leave written instructions detailing the treatment administered (e.g. animal, dosage, and withdrawal times).
- 2) Initial the record in the producer's treatment record.
- 3) Have the producer record the treatments administered by the veterinarian and indicate that the veterinarian treated the animal.

Ultimately, the producer is responsible to ensure that all treatments administered to dairy cattle are recorded.

- ✓ Record treatments for **all cattle** on the farm (e.g. calves, heifers, dry cattle, bulls, etc). Pesticides applied to an animal are considered treatments as well.

### Rule of Thumb:

**If a product has on the label or on the veterinary prescription:**

- A milk or meat withdrawal, **producers must record its use.**
- No milk or meat withdrawal, **producers do not need to record its use.**

If you treat a group of animals, separate treatment entries are not required for each animal, but each treated animal must be accounted for, for example, a range of animal identification numbers is adequate. It is also possible to record treatments of groups, as long as a producer can determine which animals were in which group at the specific time of treatment. A herd inventory may be necessary in this case.

An animal's common or barn name is not an adequate form of identification. Any eventual milker (e.g. relief milker) has to be able to identify each animal. If names are used, some system of permanent identification (e.g. list of names cross-referenced with ear-tag numbers) has to be available. Stall cards are not adequate either. Permanent identification, such as cow number, must be cross-referenced on the stall card.

### Sample Options for Recording Repetitive and Multiple Livestock Treatments

**Purpose:** to **simplify** record keeping for cows that receive the same treatment at every milking, and where groups of cows all receive the same treatment as often occurs with breeding synchronization programs. Both these situations often result in the use of animal health products that have a withdrawal for meat even if they do not have a withdrawal for milk. There is a need to ensure the safety of both milk and meat from these treated cows. If producers follow the procedures outlined below, they can simplify their records while minimizing the risk by observing any withdrawal periods before milking or shipping treated cattle.

Most animal health products that are routinely administered in a repetitive manner to dairy cows (e.g. oxytocin, prostaglandin, GnRH) are available in products with no milk withdrawal.

**1. Repetitive treatments to the same animal with one drug** (e.g. treatments that are administered at every milking for duration of lactation):

- a) The animal's identification along with the details of the treatment must be recorded, but in place of an individual record for each treatment, the a start date is recorded. After the final treatment, the end date is recorded. Some **example formats** are:
  - i. Use a separate page of the Livestock Treatment Record only for cows that receive these repetitive treatments;  
**OR,**
  - ii. Write separate “abnormal or treated milk” or “shipping animals” SOPs for each animal that is undergoing repetitive treatments. Each SOP must include the details of the treatment and would itself become the treatment record; therefore, even if the animal is sold, the producer must keep the SOP for a year or transfer the information to the Livestock Treatment Record);  
**OR,**
  - iii. Record the identification of animals receiving repetitive treatments (with the treatment details) at the top of each page of the treatment records or month on the calendar (e.g. DHI calendar).

**AND,**

- b) If a producer has a separate system for recording repetitive treatments,
  - i. The SOP for Milking Cattle with Treated Milk must identify where the producer records repetitive treatments;  
**AND,**
  - ii. The SOP for Shipping Cattle must identify where the repetitive treatment record is. This enables employees to find the record and check it before shipping an animal.

**2. Repeated treatments of different animals with multiple different drugs –** (e.g. breeding synchronization programs that involve a series of injections with different drugs administered to many cows over a period of time):

- a) Design a method to record multiple treatments that ensures treated milk and meat are not shipped (Note: all the same information required in section 4.6.1 are required in this record). This may be similar to the records described in section 1a) above, where the treated cows' identification and details of treatment are recorded on one page with multiple entries for the dates of treatment;

**AND,**

- b) Ensure the SOP for Milking Cattle with Treated Milk identifies where the producer records multiple treatments.

**AND,**

- c) Ensure the SOP for Shipping Cattle identifies where the multiple treatment record is; thereby, enabling employees to find the record and check it before shipping an animal.

### 4.6.2 Standard Operating Procedures

To ensure that all personnel on a farm understand and follow the same procedures when treating an animal, a general Standard Operating Procedure must be written for treating cattle. The SOP must contain enough information to ensure that someone treating animals would not cause a milk or meat hazard. The procedure must include the various mandatory Best Management Practices outlined in this chapter related to the use of livestock medicines and other chemicals.

You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey**:

- ✓ Read and follow label directions to determine proper dosage and ensure livestock medicines are administered properly.
- ✓ Use products approved in Canada for use in dairy cattle, unless a veterinary prescription indicates otherwise. This includes only using registered pesticides.
- ✓ Obtain a written veterinary prescription for all treatments given extra-label.

**Please note:** *In Quebec, all medications administered to dairy animals must be accompanied by a written veterinary prescription.*

- ✓ Mark treated animals.
- ✓ Record the identity of any animals carrying broken needles and record the site.
- ✓ Record the treatment and the appropriate withdrawal dates for both milk and meat.
- ✓ Record treatments for all cattle on the farm (e.g. calves, heifers, dry cattle, bulls, etc). Pesticides applied to an animal are considered treatments as well.
- ✓ Ensure teats are cleaned and dried when administering intramammary infusions.

### 4.6.3 Corrective Actions

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where an animal has been administered medication or other chemicals incorrectly. The workbook contains a sample form (Record 16). See Chapter 9 for more information.

You also must record whenever a problem occurs regarding treating animals and what corrective action was taken to remedy the situation. A sample form is in the Workbook (Record 17).

## 4.7 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                                                                 | SOURCE                                                                                                                                                                                                                                                                                                                                 | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHEMICAL</b>                                                        |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Residues of livestock medicines or chemicals or vNHPs in milk and meat | <ul style="list-style-type: none"> <li>• Livestock medicines or chemicals or vNHPs improperly stored</li> <li>• Improper use of livestock medicines or chemicals or vNHPs               <ul style="list-style-type: none"> <li>– Systemic</li> <li>– Intramammary</li> <li>– Topical treatments</li> <li>– Feed</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Store and handle livestock medicines in a way that will not contaminate milk, meat or feeds.</li> <li><input type="checkbox"/> Store livestock treatments and needles in a clean and sanitary manner and according to label directions.</li> <li><input type="checkbox"/> Store medicines and chemicals intended for use in non-lactating and lactating dairy cattle and products not intended for dairy cattle in separate cupboards, shelves or areas (if stored on same shelf).</li> <li><input type="checkbox"/> Use only livestock medicines (including medicated foot baths) approved in Canada for use in dairy cattle.</li> <li><input type="checkbox"/> Use livestock medicines and pesticides according to the label or written instructions from a veterinarian or use products listed in <b>Section 5</b> of the Permitted Substances Lists for Livestock Production (CAN/CGSB-32.311-2006) according to the specifications indicated.</li> <li><input type="checkbox"/> Create a drug listing or catalogue of all medications and chemicals used on livestock including product name and storage location.</li> <li><input type="checkbox"/> Mark all treated cattle in the milking herd that have milk withdrawals (e.g. leg bands).</li> <li><input type="checkbox"/> Maintain a permanent written record of livestock treatments.</li> <li><input type="checkbox"/> Have an SOP for treating animals.</li> <li><input type="checkbox"/> Have a corrective action plan in case an animal is treated incorrectly.</li> </ul> |
| <b>PHYSICAL</b>                                                        |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Broken needles in meat                                                 | <ul style="list-style-type: none"> <li>• Intramuscular and subcutaneous injection of livestock medicines</li> </ul>                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li><input type="checkbox"/> Record the animal and site of the broken needle.</li> <li><input type="checkbox"/> Have a veterinarian remove the broken needle — if this is not possible; inform packing plant or next buyer of broken needle.</li> <li><input type="checkbox"/> Have a written plan to deal with the situation where a treated animal or an animal with a broken needle has been sold and the next buyer was not informed?</li> <li><input type="checkbox"/> Use recommended tools and techniques when administering injections.</li> <li><input type="checkbox"/> Ensure animal to be injected is properly restrained.</li> <li><input type="checkbox"/> Use subcutaneous route to administer medications by injection if label permits.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## 5.0 MILKING MANAGEMENT (BMP 5, CCP 1)

### Index:

|                                                  |
|--------------------------------------------------|
| Pre-milking                                      |
| Milking                                          |
| When to Test Milk for Antibiotics                |
| Summary of Hazards and Best Management Practices |



## Workbook Self-Evaluation Questions

### BMP 5 Milking Management

Good milking management is critical in the production of safe and quality milk. During the milking process, bacteria and residues from the environment can be transferred into the milk. Furthermore, the udder health and, hence, quality and safety of milk of uninfected animals are at risk if proper control measures are not taken to prevent the spread of contagious mastitis.

| <b>Reference Manual Chapter 5</b> |                                                                                                                                                                  |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>35.</b>                        | Have you established and implemented a Standard Operating Procedure for pre-milking? (Record 1) (Demerits)                                                       |
| <b>36.</b>                        | Have you established and implemented a Standard Operating Procedure for milking? (Record 2) (Demerits)                                                           |
| <b>37.</b>                        | Do you ensure that all teats are thoroughly cleaned, sanitized and dried (e.g. manure and teat dips removed) before milking, using approved products? (Demerits) |
| <b>38.</b>                        | Have you established and implemented a Standard Operating Procedure to minimize the risk of shipping abnormal milk? (Record 3) (Demerits)                        |

## CCP 1 Milking Treated Animals

The process of milking is the last control point where a producer can prevent chemical residues from treated animals' milk entering the human food chain.

| <i>Reference Manual Chapters 4, 5</i> |                                                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>39.</b>                            | Have you established and implemented a Standard Operating Procedure to minimize the risk of shipping milk from treated cattle? (Record 3)                                                                                               |
| <b>40.</b>                            | Do you always follow the recommended <b>milk</b> withdrawal times for:                                                                                                                                                                  |
|                                       | <ul style="list-style-type: none"> <li>• Medicated feeds?</li> </ul>                                                                                                                                                                    |
|                                       | <ul style="list-style-type: none"> <li>• Livestock pesticides?</li> </ul>                                                                                                                                                               |
|                                       | <ul style="list-style-type: none"> <li>• Livestock medicines (including ensuring that when an animal calves or aborts that the withdrawal time for any dry cow treatment she may have been given has been followed)?</li> </ul>         |
| <b>41.</b>                            | Do you test milk from new animals for inhibitors before shipping their milk, not ship the milk unless the results are negative and record the results? (Record 10) <b>Or</b> do you have a letter of guarantee from the previous owner? |
| <b>42.</b>                            | Do you keep a record of any problems that have occurred regarding milk residues and the corrective actions taken? (Record 17)                                                                                                           |

## Introduction

Producing safe milk is possible on a continuous basis if every person involved with milking works consistently. Best management practices are the foundation of a food safety program. Establishing standard operating procedures (SOPs) is the first step in applying BMPs in a consistent manner. Consistency with a repetitive task, such as milking, is necessary not only to produce safe milk, but also to produce it efficiently.

- Ensure that all staff wear clean clothing for each milking. Clothing soiled by manure or bedding can carry bacteria such as *E. coli*.
- Practice good personal hygiene by washing hands.

Standard operating procedures help you and your staff to:

- Know which animals produce milk that cannot go into the bulk tank - to prevent contamination of milk in the bulk tank.
- Apply the same milking routine to each milking - essential to obtain good milking performance.

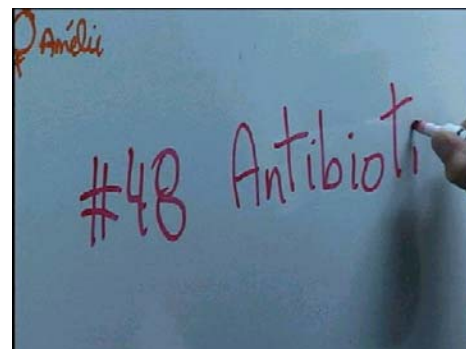
SOPs need to be posted or readily accessible and regularly updated. Employees need to be trained and SOPs need to be evaluated on a regular basis to ensure consistency. Samples of some standard SOP forms can be found in the Workbook in Chapter C.

## 5.1 PRE-MILKING

To ensure cattle are milked with clean and properly functioning equipment, a pre-milking SOP is an important part of your CQM Program. The SOP must contain enough information to ensure that a relief milker can set up the system to start milking in a manner that ensures the safety of the milk (i.e. cattle are milked with clean and properly functioning equipment). You can use the Workbook (Chapter C – SOPs) to describe step by step the various actions that are taken on your farm during pre-milking.

You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey**. Your SOP should be posted in a visible location in the milk room or kept in a location easily accessible by all employees:

- ✓ **Check the permanent and temporary records of treatment** and ensure that all treated, lactating animals (and dry animals if they are housed with lactating animals) are located and have treated animal identification.
- ✓ **Check for animals whose milk is unfit for human consumption** (i.e. colostrum, clinical mastitis, etc.).
- ✓ **Check milk contact surfaces for cleanliness.**



- ✓ **If a bulk tank is washed manually, ensure that it is clean.** The same cleaning principles apply to both manually and automatically washed systems. Producers who manually wash bulk tanks should follow these recommended four steps:
  - Step 1: Rinse the bulk tank and the bulk tank valve to remove residual milk (e.g. with hose), as soon as possible after milk is picked-up. Milk should not be allowed to dry on any parts of the bulk tank.
  - Step 2: Warm the bulk tank before the hot wash, by rinsing it with warm water. Steps 1 and 2 can be accomplished by adding a "Y" hose to your hot and cold taps and turning them both on, so that the warm first rinse also warms up the bulk tank.
  - Step 3: Wash the bulk tank and bulk tank valve with hot water (e.g. 71°C (160°F) or according to the Cleaning and Sanitizing Chart) and soap. Put the hot water and soap in a clean 1-2 gallon plastic bucket, set the bucket inside the bulk tank, and brush wash the bulk tank from the bucket. The water will remain hot throughout the whole wash and your soap concentration will be high. Never add soap and water directly to the tank. Rinse the soap and water out of the bulk tank. A clean plastic bucket will not scratch your bulk tank's polished finish.
  - Step 4: Add warm or cold water and acid to your bucket and lightly brush the bulk tank. Let it drain. Do not rinse.  
Note: If the bulk tank was washed several hours before the first milking, it is recommended to sanitize the tank about 20 minutes before the first milking. Add warm or cold water and sanitizer to your clean wash bucket and lightly brush the bulk tank milk contact surfaces.
- ✓ **Sanitize the surfaces regularly** to minimize bacteria level on equipment surfaces.
- ✓ **Wash your hands** to reduce bacteria level on hands.
- ✓ **Check the milk temperature or inspect the empty bulk tank**, specifically the interior, paddle, dipstick and outlet valve for cleanliness once a week using a strong flashlight. Record what you see.
- ✓ **Check that the bulk tank is completely drained.** This will ensure water is not being added accidentally to the milk and affecting the freezing point, and ensure cleaning/sanitizing chemicals are not being added to the milk. If the milk contact surface is unclean, refer to Chapter 11 for troubleshooting guides.
- ✓ **Close the bulk tank outlet valve and put on end cap.** Avoid contact with the rim or inside of the valve and cap with your fingers, as this will contaminate the inside milk contact surfaces.
- ✓ **Check the milking units for cleanliness and the teat cup liners for proper alignment.** This will ensure raw milk is not being contaminated with residual bacteria, and that liners are working properly. If any of the milk contact surfaces are unclean, refer to Chapter 11 for troubleshooting guides.

- ✓ **Check that the receiver jar, pipeline, weigh jars, milk hoses and other potential areas where water could collect are fully drained.** This will ensure water is not being added accidentally to the milk and affecting the freezing point, and that cleaning or sanitizing chemicals are not being added to milk.
- ✓ **Install a milk filter.** To maintain the effectiveness of keeping out bacteria and debris, the milk filter should be replaced before or after each cleaning as determined by milking equipment manufacturer's recommendations.
- ✓ **Move the milk delivery line (transfer pipe) from the wash sink over to the bulk tank.** With the safety switch in place, this allows milking equipment to be operational and stops milk from accidentally going down the drain.
- ✓ **Put the wash diverter valve into the 'milking' position.** This will allow milk from both sides of the milklane to flow by gravity to the receiver jar.
- ✓ **Verify teat dip container(s) is/are clean and ready for use.** This will ensure an adequate amount of dip available for milking, and reduce the spread of contagious diseases to cows/heifers.
- ✓ **Follow label directions when preparing the udder wash solution.** The proper concentration is necessary to kill bacteria.
- ✓ **Set udder wash water temperature.** Follow the product recommended temperature range to insure effective use of the product.
- ✓ **Check supply of single-service towels.** Restock if necessary. You should not run out of towels, or reusable cloth towels, during milking, and you should never reuse disposable towels. Contagious diseases can be spread this way.
- ✓ **Prepare the treated animal milking units,** if there are treated lactating animals or animals with milk unfit for human consumption.
- ✓ **Switch on the vacuum pump and check vacuum level on the vacuum gauge.** Establish the normal vacuum range SOP for equipment set-up. Refer to the Chapter 11 for guidelines on solving common equipment problems.
- ✓ **If the tank is empty, turn on cooler when milk reaches agitator.** This will ensure proper milk cooling without freezing. It will also slow bacteria growth and help prevent 'malty'-flavoured milk. [Note: producers can include this required element in the SOP for milking instead of the SOP for pre-milking.]
- ✓ **Wear disposable gloves.** This can help reduce spread of contagious bacteria from animal to animal such as *Staphylococcus aureus*. Wearing disposable gloves can also help reduce spread of bacteria from the hands of the operator to raw milk.
- ✓ **Close the doors when you leave the milk room.** This keeps odours out to prevent 'barny' or feed flavours in milk. This also prevents contamination from dust or dirt in



the air, and keeps unwanted insects, rodents and other animals out. Self closing doors are recommended.

- ✓ **Check the milk room after a few animals are milked.** This will serve as a double-check to ensure everything is in order (i.e., pipe in the bulk tank, cooler is turned on and cap is on the end valve).

## 5.2 MILKING

### 5.2.1 General Milking

Consistency in the day-to-day implementation of your milking procedures is an important part of your Best Management Practices for milking. Creating your own milking SOP in the workbook will ensure this occurs. The SOP must contain enough information to ensure that a relief milker can milk in a manner that ensures the safety of the milk.

You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey:**

- ✓ **Create a teat sanitation procedure that:**

- Ensures cleaned, sanitized and dried teats (this decreases the bacterial load on teat ends; thereby, minimizing the contamination of milk with bacteria). Teats soiled with manure and dirt are laden with bacteria, and water dripping down from the dirty part of the udder onto the teats can also introduce bacteria to milk during milking.
- Uses an approved teat sanitizing product and uses it according to the label directions. [Note: your SOP does not need to state this bullet; however, you still must do the practice.]  
Producers can use teat dips, sprays, wipes or udder washes to sanitize teats, as long as producers use approved products according to the labels. Teat dips or sprays can often be used full strength, while udder washes may need to be diluted. Producers must pay close attention to the label instructions to ensure they are using the products correctly. Producers can tell if a teat sanitizing product is approved by looking for a DIN number. Caution: a post-dip may not be approved for use as a pre-dip.
- Uses single service towels (paper or cloth) to prevent spread of micro-organisms from animal to animal.
- Wipes teats for 15 to 20 seconds for proper stimulation.
- Avoids or limits water on the teats.
- Ensures the teats, not the udder, are wiped.

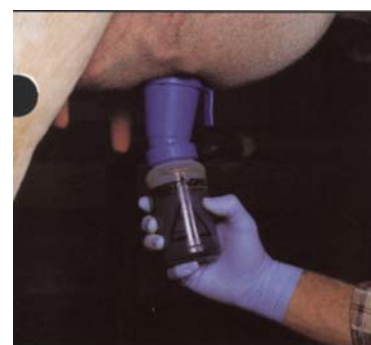
Proper milking procedures will ensure high quality, safe milk by:

- reducing the hazards that could contaminate milk
- reducing the incidence of inhibitors in raw milk
- improving udder health and reducing Somatic Cell Counts.

You will also realize the benefits of reduced milking time and increased milk production.

Even teats that appear clean to the naked eye contain bacteria that can affect the safety and quality of milk; therefore, the practice of “dry-wiping” is unacceptable.

- ✓ **Identify cattle** that require special identification (e.g. fresh, dry, abnormal milk).
- ✓ **Detect clinical mastitis** (red, hard, swollen or hot quarters).
- ✓ **Clean very dirty teats** before forestripping.
- ✓ **Forestrip before cleaning teats** (or immediately after pre-dipping) allows for better:
  - Mastitis detection, especially with a black bottom strip cup. (Do not forget to discard abnormal milk.).
  - Teat stimulation.
- ✓ Ensure the maximum benefit of naturally produced oxytocin and to obtain a rapid and complete milk out, units are attached 45 to 90 seconds after the beginning of teat stimulation, always using the same lag-time.
- ✓ **Minimize air admission into the teat cups** during attachment and removal.
- ✓ **Adjust units to reduce the incidence of liner slips** and favour an equal and complete milk out.
- ✓ **Avoid machine stripping.**
- ✓ Shut-off vacuum with or without automation, as soon as there is minimal milk flow, and remove the unit smoothly.
- ✓ **Spray or, preferably, dip teats with a disinfectant** immediately after unit removal, making sure the whole teat is covered.



### 5.2.2 Milking Animals with Abnormal Milk

**Milk that is unfit for human consumption must be diverted from the bulk tank.** To prevent abnormal milk from entering the bulk tank, establish your SOP in the workbook to describe how these animals must be milked. The SOP must contain enough information to ensure that a relief milker can identify and milk animals with abnormal milk and keep the milk out of the bulk tank. You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey:**

- ✓ Discard the milk from those quarters that have abnormal milk (e.g. mastitic milk, bloody milk) and for the first 3 days in milk (colostrum). **Never use quarter milkers on a treated animal.** Antibiotics can be released into the milk regardless of the site of entry. For example, treatment into one quarter will result in residues in the other non-treated quarters.
- ✓ **Check both permanent and temporary treatment records** to determine which animals' milk is unfit for consumption. Use a blackboard or white board that is visible in the parlour or barn and is close to where milking takes place to remind the operator of a treated animal.
- ✓ **Mark animals with abnormal milk.** Use a distinctly different colour of leg band to distinguish special animals. For cattle that have milk unfit for human consumption, mark red crosses on the animals' rumps as an additional precaution. See Chapter 4 for more examples of marking treated cattle.
- ✓ **Segregate animals with abnormal milk.** The risk of shipping abnormal milk is reduced if animals with abnormal milk are kept separately from the herd. If these

animals are milked last into the milkline, make sure the milk delivery line or transfer line is taken off the bulk tank before milking them.

- ✓ **Establish a routine** for handling abnormal milk from animals that cannot be segregated.
- ✓ **Clean, check and maintain an extra milking unit used for milking animals with abnormal milk.** Maintain these units in the same manner as the other units.
- ✓ If the animal has **not** been treated, **use a quarter milker to discard the milk from a single infected quarter.** This allows you to improve milk quality without having to discard too much milk.
- ✓ Clearly identify animals infected with contagious bacteria (e.g., *Strep. agalactiae* and *Staph. aureus*) and milk them separately to prevent the spread of contagious diseases to other animals. If possible, designate one milking unit for milking infected animals or milk them last.
- ✓ After milking an animal with contagious bacteria, disinfect the unit by:
  - Automatic back-flushing.
  - Manually disinfecting each unit. The recommended method for manual disinfecting is:
    - First, rinse both the exterior and interior of the unit.
    - Next, dip the claw in a sanitising solution containing 25-50 ppm of iodine — ensure solution stays in contact with interior of claw for 30 seconds.
    - Finally, rinse the claw and let it drain.
- ✓ Whenever possible, milk cattle with a doubtful status, such as purchased replacement and high SCC cows, after the healthy animals and before the infected ones. This will reduce the risk of spreading a contagious infection.
- ✓ Whenever possible, milk early lactation cattle before late lactation cattle, as they are less at risk of being infected by a contagious microorganism.

### 5.2.3 Milking Treated Animals

**Milking is a Critical Control Point** on a dairy farm because it is the last step in the process of producing milk where you can prevent treated milk from entering the bulk tank. When milking, you must ensure that milk from treated animals that have not met appropriate withdrawal times is not shipped for human consumption. Never use quarter milkers on a treated animal. Antibiotics can be released into the milk regardless of the site of entry.

**Critical Control Point:** Milking treated animals

**Hazard:** Chemical: pharmaceuticals (e.g. antibiotic residues)

**Critical Limit:** Negative by a recognized test by the provincial regulatory authority.

**Control Measures:** Follow milking treated animals Standard Operating Procedures when milking. Test new animals' milk for inhibitors and ensure a negative result before shipping milk.

### **Standard Operating Procedures:**

To prevent treated milk from entering the bulk tank, establish an SOP for milking treated animals in the workbook to describe how these animals must be milked. The SOP must contain enough information to ensure that a relief milker can identify and milk treated animals and keep the milk out of the bulk tank. You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey:**

- ✓ **Check the treatment records** to ensure a treated animal has met the appropriate withdrawal times for milk before shipping her milk. Treatments include medicines, pesticides, and medicated feeds. Use a blackboard or white board that is visible in the parlour or barn and is close to where milking takes place to remind the operator of a treated animal.
- ✓ When an animal calves, check treatment records to make sure the withdrawal times for any dry cow treatments have been met before shipping her milk.
- ✓ If new animals are purchased [e.g. springing heifers (less than 60 days before calving), lactating cattle, or dry cows], you must either:
  - o Test their milk and ensure that it passes the official provincial regulatory test before shipping the milk. Record the test results (Record 10). New lactating animals, dry cows or springing heifers may have been treated previous to arriving on a producer's farm and the seller may not have known or may have neglected to pass on the treatment information; therefore, these new animals are considered an antibiotic residue risk. A discussion on antibiotic test kits can be found at the end of this chapter.
  - OR**
  - o Obtain a letter of guarantee from the previous owner. If the previous owner writes a letter guaranteeing that the animal is free from chemical residues or outlining the treatment(s) administered to the animal, then you do not have to test the animal's milk. In order for the letter to be valid, the previous owner must have owned the animal for at least the last two months. The letter of guarantee does not have to be a formal letter. It could be a note or memo (e.g. at bottom of bill of sale) that includes:
    - The animal's identification,
    - Date,
    - Declaration of no pending withdrawals or details of treatments,
    - Declaration of owning the animal for at least the last two months or a letter of guarantee from the previous owner or negative antibiotic test results, and,
    - Signature.

See the Workbook for a sample letter of guarantee/shipping record.

- ✓ Ensure residual treated milk remaining in equipment after milking a treated animal is not shipped. Some ways to achieve this are:
  - **Clean, check and maintain extra milking unit used for fresh or treated animals.** Maintain these units in the same manner as the other units.
  - **Milk treated animals last** and remove the swing pipe from the bulk tank before starting to milk them.
  - If treated animals are milked between untreated animals, they should be milked into a bucket or a trap pail. Quickly rinsing the four teat cups, claw, tubes, weight jar and meter after the treated animal may not be enough; make sure these components are **washed thoroughly**, preferably with hot water. Some drugs can be sticky and can cause positive inhibitor tests if producers only rinse the equipment. Using an extra milking unit reduces the risk of error. If the trap pail is connected to the milklane, make sure it cannot spill into it. It is safer to use a vacuum source other than the milklane for the trap bucket.
- ✓ **Ensure milkers know the farm's system for marking treated animals.** As required in the SOP for treating an animal, treated animals must be marked. See Chapter 4 for more information. [Note: your SOP does not need to state this bullet; however, you still must do the practice.]
- ✓ Establish a routine for handling milk from treated animals that cannot be segregated.
- ✓ House dry cattle separately from the milking herd.
- ✓ House treated animals separately from the milking herd.

### Corrective Action:

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where treated milk has accidentally been put in the bulk tank. The Workbook contains a sample form (Record 16). See Chapter 9 for more information

You also must record whenever a problem occurs regarding shipping milk and what corrective action was taken to remedy the situation. A sample record is in the Workbook (Record 17).

### Records:

- ✓ Livestock treatment record required in BMP 4. A sample record is in the Workbook (Record 10).

## 5.3 WHEN TO TEST MILK FOR ANTIBIOTICS

The cost of discarding milk from one animal that contains residues is much lower than the cost of discarding an entire bulk tank, a transport tanker or a processor's silo because of contamination caused by that one animal.

Following the label treatment instructions and withdrawal times reduces the risk of milk

becoming contaminated with antibiotic residues. There are several instances where there may be doubt whether milk from treated animals is residue-free.

Milk should be checked for antibiotic residues when:

- Any cattle are purchased [e.g. lactating or dry animals or springing heifers (less than 60 days before calving)]. A letter of guarantee from the previous owner may be used instead of testing (see section 5.2.3).
- Very ill animals, e.g. animals with clinical mastitis, have been treated. They may not be able to eliminate antibiotics at the same rate as healthy cattle, so their milk may need to be tested even when normal withdrawal times have been observed.

Bulk tanks should be checked for antibiotic residues before pickup when animals in the barn have been treated recently and when there is a risk that contaminated milk may have reached the bulk tank — to be certain, test each bulk tank before each pickup as a routine practice.

### 5.3.1 Understanding the Limitations of Antibiotic Test Kits

Anyone who uses kits to test milk for antibiotics should be familiar with how the tests are performed and some of the limitations to test kit performance. Some of the factors that influence the test result are the following:

- **Sample of milk tested** - Antibiotic test kits were developed to screen for antibiotics in milk that was pooled together from several animals, such as bulk tank milk. These tests are not usually as accurate when used to test milk from individual animals. As a result, the readings from the test kit should be used as a **guide only**.
- **Antibiotic identification and detection** - **Most** test kits currently on the market do not identify the specific antibiotic in the sample that caused the positive result. They only indicate that an antibiotic is present.

Test kits do not detect all antibiotics equally well. They are designed to detect lower concentrations of *some* antibiotics. Certain antibiotics are not detected at all by some of the most popular screening test kits used on farms. This can cause a problem if you are trying to detect an antibiotic using a test kit that was not designed to measure it. You must ensure that the kit can detect the specific antibiotic that was used to treat the animal.

On-farm test kits only give a positive or negative result. They do not show how much of the antibiotic is present in a positive milk sample. For example, the positive level for the kit may not be the same positive level for the official test. It is important to know that the kit can detect antibiotics at least as well as the official test does.

### 5.3.2 Getting Accurate Results for Antibiotic Test Kits

The following are the Best Management Practices you can apply to ensure your test kits give an accurate result:

- ✓ Use a kit designed to detect the antibiotic that was used to treat the animal to be tested.
- ✓ Ensure the kit expiry date has not been exceeded.
- ✓ Ensure the kit is stored properly, and follow the test procedure exactly — including testing a known negative milk sample.
- ✓ Test milk collected only after the recommended withdrawal time has been observed.
- ✓ Test only milk that is visually normal.
- ✓ Retest milk that gives a positive test result, using a different test where possible.
- ✓ Consult with your veterinarian, milk inspector or personnel at the laboratory that performs official testing when interpreting test results.

## 5.4 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                             | SOURCE                                                                                                                                                                   | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BIOLOGICAL</b>                  |                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Communicable disease (from people) | <ul style="list-style-type: none"> <li>• Dirty hands and clothing</li> </ul>                                                                                             | <input type="checkbox"/> Practice personal hygiene.<br><input type="checkbox"/> Wear disposable gloves.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Environmental bacteria             | <ul style="list-style-type: none"> <li>• Dirty teat and udders</li> <li>• Dirty hands</li> <li>• Contaminated milking equipment</li> <li>• Infected animal(s)</li> </ul> | <input type="checkbox"/> Establish a SOP for pre-milking.<br><input type="checkbox"/> Establish a SOP for milking.<br><input type="checkbox"/> Ensure teats are cleaned, sanitized and dried.<br><input type="checkbox"/> Establish an SOP for milking animals with abnormal milk.<br><input type="checkbox"/> Discard abnormal milk.<br><input type="checkbox"/> Use single-service towels to prep teats.<br><input type="checkbox"/> Ensure the environment is clean.<br><input type="checkbox"/> Practice personal hygiene.<br><input type="checkbox"/> Sanitize milking units.<br><input type="checkbox"/> Segregate cattle.<br><input type="checkbox"/> Milk infected cattle separately.<br><input type="checkbox"/> Forestrip and milk-out properly.<br><input type="checkbox"/> Examine udder.<br><input type="checkbox"/> Teat-dip after milking. |
| Colostrum                          | <ul style="list-style-type: none"> <li>• Recently freshened cows/heifers</li> </ul>                                                                                      | <input type="checkbox"/> Do not add milk to bulk tank from animals 15 days prior to calving or 3 days after calving.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| HAZARD                                                                     | SOURCE                                                                                                | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHEMICAL</b>                                                            |                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Livestock medicine and chemical residues in milk and meat<br><b>(CCP1)</b> | <ul style="list-style-type: none"> <li>Any treatment with livestock medicines or chemicals</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Have an SOP in place to milk cattle with abnormal or treated milk.</li> <li><input type="checkbox"/> Follow recommended milk withdrawal times for medicines, pesticides and medicated feed.</li> <li><input type="checkbox"/> When an animal calves or aborts, check withdrawal time on treatment records.</li> <li><input type="checkbox"/> Test milk from new animals entering the herd before shipping their milk or get a letter of guarantee from the person selling the animal.</li> <li><input type="checkbox"/> Have a written plan on how to deal with a situation where treated milk enters the bulk tank.</li> <li><input type="checkbox"/> Milk treated animals last or with separate equipment.</li> <li><input type="checkbox"/> Post treatment information on a message board to ensure people milking cattle are aware of which animals have been treated.</li> <li><input type="checkbox"/> Have a program in place to minimize the risk of contaminating the bulk tank with milk from treated animals (e.g. milk last).</li> <li><input type="checkbox"/> <b>See Chapters 3, 4, 10, and 11.</b></li> </ul> |
| Udder wash chemicals & salves<br>Teat dip chemicals                        | <ul style="list-style-type: none"> <li>Improper removal from teats before milking</li> </ul>          | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure teats are cleaned and dried.</li> <li><input type="checkbox"/> Use an approved teat sanitizing product and use it according to the label directions.</li> <li><input type="checkbox"/> Follow label directions when preparing udder wash solution.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## 6.0 COOLING AND STORAGE OF MILK (CCP 2)

### Index:

|                                                  |
|--------------------------------------------------|
| Cooling and Storage of Milk                      |
| Cooling System Evaluation and Maintenance        |
| Summary of Hazards and Best Management Practices |



## Workbook Self-Evaluation Questions

### CCP 2 Cooling and Storage of Milk

Milk must be cooled quickly and stored at a temperature greater than 0°C and less than or equal to 4°C to ensure that bacteria do not multiply. Monitoring the bulk tank temperature can ensure that milk is stored safely.

| <i>Reference Manual Chapter 6</i> |                                                                                                                                             |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>43.</b>                        | Is the bulk tank temperature recorded and checked <u>after</u> every milking? (Record 12)                                                   |
| <b>44.</b>                        | Do you keep a record of any problems that have occurred regarding cooling and storage of milk and the corrective actions taken? (Record 12) |
| <b>45.</b>                        | Do you have a yearly cooling system evaluation done by an industry professional?                                                            |

## Introduction

Methods of milk storage have changed dramatically over the history of the dairy industry. Modern technology has enabled producers to store milk temporarily on their farms before shipping it to the processing plants. However, to be effective, the system must work and milk must be cooled quickly and stored at a temperature greater than 0°C and less than or equal to 4°C to reduce bacterial growth. Monitoring the bulk tank temperature can ensure that milk is stored safely and that the cooling equipment is functioning properly.

## 6.1 COOLING AND STORAGE OF MILK

**Under the HACCP-like system, cooling is one of the CCPs in milk production (CCP2).** Bacteria multiply rapidly when milk is stored over 4°C (40°F) or cooled too slowly. Excessive bacteria counts and the presence of disease organisms in milk are risks to human health. A producer can control the multiplication of bacteria effectively if milk is cooled and stored properly.

**Critical Control Point:** Cooling and storing milk

**Hazard:** Biological: pathogenic bacteria

**Critical Limit:** Bulk tank temperature.

The 1<sup>st</sup> milking must be cooled to 10°C or less within one hour and to a temperature greater than 0°C and less than or equal to 4°C within two hours after milking and maintained at that temperature. When subsequent milkings enter the tank, blend temperature shall not rise above 10°C for longer than 15 consecutive minutes and milk shall be cooled to a temperature greater than 0°C and less than or equal to 4°C within one hour after milking and maintained at that temperature.

Milk cooling systems include a cooling tank that absorbs heat from the milk. The heat is transported by a refrigerant to a refrigeration unit, where it is dissipated.

Some systems also have plate coolers which work to reduce the temperature of the milk before the milk reaches the refrigeration units. Plate coolers help cool milk faster.

**Control Measures:** Check the temperature of the milk after each milking. Producers must have an accurate, operating bulk tank thermometer or recording thermometer. Producers must be able to demonstrate how they know that thermometers are accurate and operating (e.g. annually calibrate thermometers).

Thermometer Calibration: thermometers can be simply calibrated by filling a glass with ice and then filling it up with cold water. Immerse the thermometer in the ice water and reposition it to read 0°C.

Proper cooling is critical for the maintenance of milk safety. Recommended cooling guidelines (National Dairy Code – section 15) can be seen in Table 12.

**Table 12: Cooling Efficiency Guidelines**

| Stage                                           | Temperature Range                                                                                                                                                                                                                                    |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PRE-COOLING</b>                              | 33°C (92°F) to 15°C to 21°C (60°F to 70°F)                                                                                                                                                                                                           |
| <b>1<sup>ST</sup> MILKING</b>                   | <ul style="list-style-type: none"> <li>10°C (50°F) within 1 hour</li> <li>Greater than 0°C and less than or equal to 4°C (34°F to 40°F) within 2 hours — ½ hour preferred</li> </ul>                                                                 |
| <b>2<sup>ND</sup> &amp; SUBSEQUENT MILKINGS</b> | <ul style="list-style-type: none"> <li>Blend temperature should never go above 10°C (50°F) for longer than 15 consecutive minutes</li> <li>Greater than 0°C and less than or equal to 4°C (34°F to 40°F) within 1 hour — ½ hour preferred</li> </ul> |
| <b>IDEAL STORAGE</b>                            | <ul style="list-style-type: none"> <li>2°C to 3°C (36°F to 38°F)</li> </ul>                                                                                                                                                                          |
| <b>AT PICK-UP</b>                               | <ul style="list-style-type: none"> <li>Greater than 0°C and less than or equal to 4°C (34°F to 40°F)</li> </ul>                                                                                                                                      |

## Measuring Options:

\*Please note that these parameters do not apply to robotic milkers.

**1. Tank Thermometer:** You have an accurate, operating bulk tank thermometer (accurate within  $\pm 1^\circ\text{C}$ ) and use the bulk tank thermometer's read-out to measure the temperature of the milk after each milking. You then permanently record the temperature and initial the record. Since the temperature may be taken directly after milking, the milk may not be greater than  $0^\circ\text{C}$  and less than or equal to  $4^\circ\text{C}$ ; however, you must determine what temperature is normal for your system at the time the temperature is regularly taken. Furthermore, you must make sure that this "normal" temperature is indicative of a validly working system. The temperature must be taken at the same time during the post-milking procedure every day.

**OR**

**2. Basic Time Temperature Recorder:** You use a Time Temperature Recorder to measure the temperature of the milk after each milking. If the recorder does not have any alarms or has basic alarms (alarm system has 'nuisance' alarms, e.g. cooling alarm goes off when tank is empty or washing), you must open the face plate of the recorder and initial the chart (or similar method) to prove that you have checked the temperature. If the recorder is of a digital design, then you must manually record the temperature and initial the record or log on the system and insert a note proving that you checked the temperature after each milking.

This is necessary because nuisance alarms have the potential to make you immune to the alarm signals and you may ignore an alarm situation.

**OR**

**3. Time Temperature Recorder with “Smart” Alarms:** If your time temperature recorder has “smart” alarms, you must have the alarms able to perform the following features and set to the following parameters if you want to eliminate recording any information manually.

Cooling alarm must be programmed to:

- Not go off when tank is empty or washing or just filling with the 1<sup>st</sup> milking.
- Alarm for 1<sup>st</sup> milking if the temperature is not greater than 0°C and less than or equal to 4°C within 2 hours from the end of milking (1/2 hour is preferred). If equipment is capable of detecting fractions of a degree, alarms may be set to a lower limit above 0°C to avoid nuisance alarms.
- Be able to set blend temperatures.
- Alarm for 2<sup>nd</sup> and subsequent milkings if blend temperature ever goes above 10°C for longer than 15 consecutive minutes and if temperature is not greater than 0°C and less than or equal to 4°C within 1 hour from the end of milking.

### **Corrective Action:**

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where milk has not been cooled properly within the acceptable cooling period. The Workbook contains a sample form (Record 16). See Chapter 9 for more information.

You also must record whenever a problem occurs regarding cooling and storage of milk and what corrective action was taken to remedy the situation. A sample form is in the Workbook (Record 17).

### **Records:**

- ✓ Bulk Tank Temperature log. A sample record is in the Workbook (Record 12), complete with a section to identify the normal temperature ranges for your bulk tank after milking. Automatic bulk tank recording thermometer charts and computer encrypted temperature data are also acceptable records. Manual and/or electronic records must be easily accessible to staff.

The requirement to check the bulk tank temperature after each milking must appear in the Post-milking cleaning SOP which is described in Chapter 7.

## 6.2 COOLING SYSTEM EVALUATION AND MAINTENANCE

The cooling system will cool your milk rapidly at every milking if you have it tested and maintained annually. The main points to check are:

- Refrigerant pressure
- Thermometer accuracy
- Thermostat settings
- Condensing unit cleanliness

It is recommended that you have your cooling system evaluated once a year by an industry professional.

## 6.3 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                           | SOURCE                                                                                               | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BIOLOGICAL</b>                |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Bacteria in bulk tank<br>(CCP 2) | <ul style="list-style-type: none"> <li>• Slow cooling</li> <li>• Malfunctioning equipment</li> </ul> | <input type="checkbox"/> Check and record bulk tank temperature <u>after</u> every milking.<br><input type="checkbox"/> Have a written plan outlining how to deal with a situation when milk has been improperly cooled or stored.<br><input type="checkbox"/> Check and record bulk tank temperature before every milking.<br><input type="checkbox"/> Add or maintain a pre-cooler.<br><input type="checkbox"/> Have the cooling system evaluated annually by industry professional. |

## 7.0 FACILITY AND EQUIPMENT SANITATION (BMP 6, BMP 7)

### Index:

|                                                  |
|--------------------------------------------------|
| Equipment Sanitation                             |
| Milk house                                       |
| Milking Equipment Evaluation and Maintenance     |
| Water                                            |
| Summary of Hazards and Best Management Practices |



### Workbook Self-Evaluation Questions:

#### BMP 6 Facility and Equipment Sanitation

Good sanitation helps reduce disease, the need for antibacterial agents and the risk of contamination from chemicals, livestock medications and bacterial agents. The milk house is the final on-farm site for safety and quality control. It should be used exclusively for cooling and storing milk and for cleaning, sanitizing and storing materials and equipment used in the production and handling of milk.

| <i>Reference Manual Chapter 7</i> |                                                                                                                                                                                               |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Equipment Sanitation</b>       |                                                                                                                                                                                               |
| <b>46.</b>                        | Do you use approved cleaning products according to the accessible milk house cleaning and sanitizing chart? (Record 14)                                                                       |
| <b>47.</b>                        | Do you regularly inspect and record the cleanliness of milking equipment (e.g. receiver jar and bulk milk tank) (minimum acceptable frequency is monthly, weekly is recommended)? (Record 13) |
| <b>48.</b>                        | Do you check and record the temperature of the pre-rinse water (at least weekly) or wash water (at least monthly)? (Record 13)                                                                |
| <b>49.</b>                        | Do you keep a record of any problems that have occurred regarding equipment sanitation and pre-rinse/wash water temperature and the corrective actions taken? (Record 13)                     |
| <b>50.</b>                        | Have you established and implemented a Standard Operating Procedure for post-milking system cleaning? (Record 4)                                                                              |
| <b>51.</b>                        | Do you have your wash system evaluated annually by an industry professional and have the deficiencies been corrected? (Record 14b)                                                            |

## Reference Manual Chapter 7

### Milk House

|            |                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>52.</b> | Is the milk house used exclusively for cooling and storing milk and for cleaning, sanitizing, and storing materials and equipment used in the production and handling of milk? |
| <b>53.</b> | Are cleaning chemicals stored in a location and manner that will not contaminate milk?                                                                                         |
| <b>54.</b> | Are the milk house & external surfaces of the milking and milk storage equipment kept clean?                                                                                   |
| <b>55.</b> | Do you have a functioning safety switch or fail-safe system in place to avoid accidental entry of wash water into the tank?                                                    |
| <b>56.</b> | Have you removed all mercury thermometers and vacuum columns from the milk house?                                                                                              |
| <b>57.</b> | Do all lights near the bulk tank opening have a protective covering or do the bulbs have a protective safety coating?                                                          |
| <b>58.</b> | Do you have a yearly milking equipment evaluation done by an industry professional?                                                                                            |

## BMP 7 Use of Water for Cleaning Milk Contact Surfaces

Dairy farms require large volumes of water for cleaning milking equipment and the milk house. If the water used for cleaning is contaminated, milk safety could be compromised.

## Reference Manual Chapter 7

|            |                                                                                                                                                                                                                                                                                                                        |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>59.</b> | <b>Do you:</b>                                                                                                                                                                                                                                                                                                         |
|            | <ul style="list-style-type: none"> <li>Annually test the water used for milking equipment sanitation for the microbiological parameters determined by the provincial authority?</li> <li>Ensure the water meets the microbiological parameters?</li> <li>Keep or record the water test results? (Record 15)</li> </ul> |
| <b>60.</b> | Do you keep a record of any problems that have occurred regarding water quality and the corrective actions taken? (Record 15)                                                                                                                                                                                          |

## Introduction

Sanitation is a basic Best Management Practice for any HACCP-based system. Equipment cleanliness is very important to keep bacteria counts as low as possible in raw milk. General sanitation of the milking environment is also important to help avoid the accidental introduction of bacteria through the processes of milking and milk storage. Poor equipment cleaning is another cause of high bacteria counts and potential chemical residues through the cleaning chemicals.

While many dairy producers have highly automated systems today, producers still have to ensure that the equipment is functioning properly and is well maintained.

## 7.1 EQUIPMENT SANITATION

### 7.1.1 Cleaning the Milking Equipment According to the Cleaning and Sanitizing Chart

A qualified technician or industry professional must establish an equipment washing procedure for your farm (refer to cleaning and sanitizing chart in the Workbook, Record 14). This procedure must be posted in the milk house or located in an easily accessible place in the milk house. If system changes occur after the chart is filled out (e.g. new chemicals, new equipment), the chart must be up-dated immediately. The chart must include the name of the company, signature of the technician or industry professional who completed the report and the date it was completed.

For each wash cycle, the cleaning and sanitizing chart should specify the:

- Product name and volume of product. Products used on milk contact surfaces need to be approved for use in food establishments or recommended by the manufacturer to clean dairy equipment. The label must state one or the other to be considered approved.
- Volume of water.
- Wash water temperature (according to the label directions of the products used or equipment dealer recommendation).
- Water analysis (e.g. pH).

Table 13 outlines the recommended standard for milking equipment sanitation; however, each farm may be slightly different depending on what temperatures the products being used require.

**Table 13: Recommended Milking Equipment Sanitation Procedures.**

| CYCLE                                                                                     | PURPOSE                                                                                                                                                                                                                                                                              | TEMP. RANGE                                                                                                                                                                                         | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 <sup>ST</sup> —<br>Pre-rinse<br>milkline                                                | <ul style="list-style-type: none"> <li>Removes 90 to 95% of milk solids</li> <li>Warms up milkline</li> </ul>                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Lukewarm water, 35°C to 60°C (95°F to 140°F) at the start of the cycle and minimum 35°C (95°F) at the completion of the cycle</li> </ul>                     | <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not re-circulate water; otherwise, a milk film may be re-deposited on system.</li> <li><input type="checkbox"/> Ensure water is not too hot; otherwise, protein will be baked onto milk contact surfaces.</li> <li><input type="checkbox"/> Reduce the amount of milk in waste disposal systems (some farmers save pre-rinse water and milk, and feed it to calves).</li> </ul>                                                                                                                                                                                                                                                  |
| 2 <sup>nd</sup> —<br>Washing the<br>milkline with<br>chlorinated<br>alkaline<br>detergent | <ul style="list-style-type: none"> <li>Removes fat and protein through addition of chlorinated alkaline detergent</li> </ul>                                                                                                                                                         | <ul style="list-style-type: none"> <li>Minimum start temperature of 71°C (160°F)</li> <li>Warmer than 43°C (110°F) at end of cycle so that fat cannot redeposit on milk contact surfaces</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Use amount of detergent according to the volume of water used and water quality (e.g. hardness, iron content).</li> <li><input type="checkbox"/> Follow manufacturer's recommendations as written on milk house cleaning chart.</li> <li><input type="checkbox"/> The solution circulating during wash cycle should have a pH between 11.0 and 12.0, total alkalinity of 400 to 800 ppm, active alkalinity of 225 to 350 ppm and chlorine content between 80 and 120ppm.</li> <li><input type="checkbox"/> Ensure wash cycle lasts 5 to 10 minutes.</li> <li><input type="checkbox"/> Ensure a minimum of 20 slugs/wash.</li> </ul> |
| 3 <sup>rd</sup> —<br>Rinsing the<br>milkline with<br>acid rinse                           | <ul style="list-style-type: none"> <li>Neutralises detergent residues</li> <li>Prevents build-up of mineral deposits</li> <li>Lower pH inhibits bacterial growth between milkings</li> <li>Reduces damage to rubber parts from high alkalinity and chlorine of wash cycle</li> </ul> | <ul style="list-style-type: none"> <li>Check manufacturer's recommendation and post on cleaning chart</li> </ul>                                                                                    | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure acid rinse pH is less than 3.5.</li> <li><input type="checkbox"/> Add acid to acid rinse cycle after each milking.</li> <li><input type="checkbox"/> Never mix an acid detergent with a chlorine-based product — <b>mixing could produce an extremely toxic lethal gas.</b></li> <li><input type="checkbox"/> Ensure acid rinse cycle lasts between 3 to 4 minutes.</li> </ul>                                                                                                                                                                                                                                               |

| CYCLE                                                      | PURPOSE                                                                              | TEMP. RANGE                                                                                                    | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                   |
|------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 <sup>th</sup> —<br>Rinsing the milkline with a sanitizer | <ul style="list-style-type: none"> <li>Disinfects system prior to milking</li> </ul> | <ul style="list-style-type: none"> <li>Check manufacturer's recommendation (generally 43°C (110°F))</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Use a solution containing 100 to 200 ppm chlorine.</li> <li><input type="checkbox"/> Run cycle just prior to milking (approximately 20 to 30 minutes before) for 3 to 4 minutes.</li> </ul> |

## 7.1.2 Regular Inspection of the Cleaning System

Most milking systems and bulk tanks are cleaned automatically. CIP (Clean In Place) automatic systems may fail and such failures may affect milk quality and safety. Prevention is the key to avoiding system failures; therefore, a regular check (minimum acceptable frequency is monthly, weekly is recommended) of these systems is an important part of your CQM Program. Manually cleaned equipment also needs to be checked to ensure adequate cleaning. A record of equipment checks must be maintained and a sample form is provided in Chapter C of the Workbook (Record 13).

### Check your automatic cleaning system or your manual cleaning process for:

#### ✓ Signs of poor cleaning including:

- Common problem areas (e.g. receiver jar, milk claws, milk hoses, etc.). Please note that you can check only common problem areas but a validator may ask to see other areas to determine the effectiveness of the check.
- Condensation in the receiver or the bulk tank.
- Traces of fat, protein or milk stone on the milk contact surfaces or on the electrodes (drying the bulk tank milk contact surfaces may help you detect deficiencies in surface cleaning).

#### ✓ Adequate water temperature of the pre-rinse or wash water. Water temperatures must compare with the detergent manufacturer requirements or equipment dealer's recommendation. Again, temperature requirements must be specified on the cleaning and sanitizing chart completed by the dealer, according to the chemicals' label directions or the equipment dealer's recommendation. The purpose of adequate water temperature is to ensure that the hot water tank is working and that the proper temperature is maintained throughout the cleaning of the equipment.

The temperature can be taken for either the pre-rinse or the wash water; however, the location and frequency must be established at the outset of the program and remain consistent.

Taking the pre-rinse water temperature is an indicator of the wash water temperature.

The pre-rinse or wash water temperature can be taken manually or with a time temperature recorder. Manual and/or electronic records must be easily accessible to staff. The requirements for either method are as follows:

**1. Manually:** You have an accurate, operating thermometer (accurate within  $\pm 1^{\circ}\text{C}$ ) and measure the temperature of the water. The temperature must be permanently recorded and the record initialed.

- **Pre-Rinse water temperature:**

- Minimum of a weekly check.
- Temperature must be taken at the beginning of the cycle with a thermometer in the fill sink.
- The temperature must conform to the specifications on the cleaning and sanitizing chart as filled out by the equipment dealer.

**OR**

- **Wash water:**

- Temperature can be taken at the beginning or end of the cycle.
- Minimum of a monthly check (weekly preferred).
- Whether start or end temperature taken, the temperature must conform to the specifications on the cleaning and sanitizing chart as filled out by the equipment dealer.

**OR**

**2. Time Temperature Recorder:** If your time temperature recorder does not have an alarm nor has basic alarms, you must initial the chart (or similar method) to prove that the temperature was checked. If the recorder is of a digital design, you must manually record the temperature and initial the record, or have a computerized record on the system proving that the temperature was checked. If the time temperature recorder has “smart” alarms, the alarms must be set according to the parameters below if you want to eliminate recording any information manually.

- **Pre-Rinse water temperature:**

- Minimum of a weekly check.
- Temperature probe must be in the fill sink or on the return wash line.
- Temperature must be taken at the beginning or end of the cycle.
- If using an alarm, alarm must be triggered if the temperature drops more than  $5^{\circ}\text{C}$  below the accepted range.

**OR**

- **Wash water:**

- Temperature can be taken at the beginning or end of the cycle.
- Minimum of a monthly check (weekly preferred).

- Whether start or end temperature taken, the temperature must conform to the specifications on the cleaning and sanitizing chart as filled out by the equipment dealer or industry professional.
- Probe can be in either the fill sink or on the return wash line.
- If using an alarm and measuring temperature at the beginning of the wash cycle, alarm must be triggered if the temperature drops more than 5°C below the accepted range.
- If using an alarm and measuring temperature at the end of the wash cycle, alarm must be triggered if the temperature drops more than 10°C below the accepted range.

### **You can also check your automatic cleaning system or your manual cleaning process for:**

- ✓ A clean bulk tank before it receives its first milking.
- ✓ The operation of each cleaning cycle.
- ✓ Proper function of the automatic detergent dispensing system.
- ✓ Pre-rinse water entering into the receiver when the vacuum pump is switched on for milking; if so, adjust the slope of the milkline.
- ✓ Proper water treatment, if you treat your water (proper function of the equipment and product).

## **7.1.3 Corrective Actions**

To prepare for emergency situations, you need written corrective action plans for improper cleaning and improper water temperatures.

### **7.1.3.1 Improper Cleaning**

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where equipment has not cleaned properly. The workbook contains a sample form (Record 16). See Chapter 9 for more information.

You also must record whenever a problem occurs regarding equipment sanitation and what corrective action was taken to remedy the situation. A sample form is in the Workbook (Record 13).

### **7.1.3.2 Improper Water Temperature**

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where the water temperature is not adequate. The workbook contains a sample form (Record 16). See Chapter 9 for more information.

You also must record whenever a problem occurs regarding pre-rinse/wash water temperature and what corrective action was taken to remedy the situation. A sample form is in the Workbook (Record 13).

### 7.1.4 Post-Milking Cleaning SOPs

To ensure that milk is cooling properly and that the equipment is cleaned adequately, a post-milking cleaning SOP is an important part of your CQM program. Write your own SOP using the Workbook (Record 4) or your own variation. The SOP must contain enough information to ensure that a relief milker can set up the cleaning system. Describe step by step the various actions that must be taken to set-up the equipment for cleaning after milking.

You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey**. This SOP should be accessible in the milk room.

- ✓ Check and record the milk temperature (after each milking) (this can be done automatically with some time temperature recorders).
- ✓ Check and record the cleanliness of milking equipment regularly (e.g. receiver jar and bulk milk tank) (minimum acceptable frequency is monthly, weekly is recommended).
- ✓ Check and record the temperature of the pre-rinse water (weekly) or wash water (monthly) (Record 13) (this can be done automatically with some time temperature recorders).
- ✓ Put the wash diverter valve into the “wash” position.
- ✓ Let air into the washline to empty the milkline.
- ✓ Clean the claws’ outer surfaces and set them in wash position.
- ✓ Empty the receiver.
- ✓ Clean the strip cup and teat dip cup.
- ✓ Move the milk transfer line from the bulk tank to the wash sink.
- ✓ Remove the milk filter, checking for milk clots and unusual dirt.
- ✓ Replace milk filter with a clean one if the milking system has a plate cooler.
- ✓ Add detergent (if using a manual system).
- ✓ Flick the wash panel switch to the “wash” position.
- ✓ Clean the milk house floor.
- ✓ Close the doors between the milk house and the barn (self-closing doors are recommended).

## 7.1.5 Wash System Evaluation and Maintenance

Milking systems are washed automatically after every milking in many installations, manually in some. As with every automatic system, problems can occur. An important part of a good on-farm food safety program is the annual evaluation and maintenance of the wash system by an equipment dealer or industry professional to prevent problems from occurring. Producers who manually wash their systems do not have to have an annual wash system evaluation conducted; however, they must write their equipment cleaning procedures in their post-milking SOP and they must write their bulk tank cleaning procedures in their pre-milking SOP.

The basis of the wash system evaluation is a CIP analysis (e.g. time, temperature, slugging action and chemical concentrations). The wash system evaluation should include all milk contact surfaces (e.g. milking equipment and bulk tank). A sample form is in the Workbook (Record 14b).

The annual wash system evaluation must include the following parameters:

- ✓ **Test water characteristics.** The amount of detergent used depends on water characteristics. These characteristics such as hardness and iron content can vary and should be tested regularly.
- ✓ **Ensure adequate circulation time.** Cleaning time is critical for the detergents to complete the cleaning functions.
- ✓ **Test water temperature and compare with the detergent manufacturer requirements and/or the farm's Cleaning and Sanitizing Chart (Record 14).** Adequate water temperature is essential for an effective wash cycle.
- ✓ **Regularly check slugging action.** Water slugs are necessary to ensure proper cleaning of the milkline. A testing protocol allows the milking machine technician to adjust the air injector to obtain proper water flow conditions.
- ✓ **Check automatic detergent dispenser for the correct amount and dispersal of chemicals regularly.** Systems can be plugged and fail to dispense; therefore, they should be tested to ensure proper chemical concentration in the wash system.
- ✓ **Include washing of all milk contact surfaces.**

Some farms have very hard water, which means that the wash systems require larger volumes of detergent. Producers can install water softeners to help reduce the amount of detergent needed.

After completing an annual wash system analysis, equipment dealers or industry professionals may identify issues with a washing system or opportunities for improvement. Some equipment dealers may check more than the CQM requirements, but producers have to correct CQM-related issues (e.g. time, temperature, slugging action and concentration).

If a new wash or equipment system is installed or a major change is made in the current system, it is recommended to have another wash system analysis performed by an equipment dealer or industry professional to ensure the new or revised system washes effectively.

## 7.2 MILK HOUSE

The milk house is the **final on-farm site for quality control**. The following Best Management Practices should be followed in the milk house:

The milk house is often the first area that visitors (consumers) see when touring or driving by your dairy operation. That first impression can determine their overall perception of the quality and cleanliness of your product.

- ✓ Use it **exclusively** for cooling and storing milk, and for cleaning, sanitizing and storing materials and equipment used in the production and handling of milk. If other items are stored in the milk house, they must not pose a food safety hazard.
- ✓ Store approved chemicals and products used in the milk house in a location and manner that will not contaminate milk. Also ensure that containers are in good condition and properly labelled (e.g. to be compatible with the cleaning and sanitizing chart).
- ✓ Ensure the milk house and external surfaces of the milking and milk storage equipment are kept clean (e.g. bulk tank and gasket around man-hole must be clean; milk house must be free of unnecessary clutter).
- ✓ A functioning safety switch or fail-safe system (for Automatic Milking Systems) must be in place to avoid accidental entry of water and cleaning chemicals into the milk. The safety switches prevent the wash system from turning on unless the swing pipe is removed from the bulk tank. If you have a manually operated clean-in-place (CIP) system, you must have a safety device as well (e.g. plug for the sink is attached to the swing pipe so that sink cannot be plugged unless the swing pipe is detached from the bulk tank).
- ✓ Remove all mercury thermometers or vacuum columns from the milk house. Mercury vacuum gauges can be replaced by mercury-free dial or digital gauges, which do not pose a health risk. **Please contact your local hazardous waste depot to dispose of any mercury thermometers or vacuum gauges!** Even if a mercury thermometer or vacuum gauge is not in use, it still must be removed.
- ✓ Ensure that any lights located near the man-hole on the bulk tank have protective coverings or that the bulbs have a protective safety coating.
- ✓ Broken glass from lights located near the man-hole on the bulk tank is another hazard to stored milk. Some milk houses have low roofs and long dip-sticks, increasing the possibility that the milk truck driver will smash a light when checking the level of the milk in the bulk tank. Florescent tubes have also been known burst on their own. It is also recommended to cover lights located near the wash sink.
- ✓ **Ensure clear drains in milking centre.** Milk room drains must handle milking equipment and bulk tank wash water. They must have an easily cleaned gas trap to keep waste odours out of the milk house and milking centre. Drains should be cleaned regularly to avoid blockage of the drain. It is recommended that drains be located a minimum of 60 cm (2 feet) away from the outlet of the bulk tank and not be placed under the tank (this is regulation in some provinces). This allows for easy access and avoids contamination of the tank outlet.

- ✓ Construct floors, walls and ceilings of smooth, durable and easy-to-clean material, and maintain cleanliness on a regular basis.
- ✓ Properly ventilate the milk house to reduce condensation and decrease mould and dust on ceilings walls and windows.
- ✓ Properly dispose of any empty milking chemicals containers.

### 7.3 MILKING EQUIPMENT EVALUATION AND MAINTENANCE

Milking machines must be in good condition to obtain high milk quality consistently. Regular maintenance will assure that milking machines can milk cattle adequately day after day. Depending upon producer expertise, regular maintenance should be done by the producer with more in-depth analysis done by the equipment dealer or an industry professional.

Milking machine technicians should be able to perform a complete evaluation protocol such as that produced by the National Mastitis Council (NMC).

A milking equipment evaluation should include:

- Teat end vacuum during milking.
- Pulsation characteristics.
- Effective reserve.
- Milkline slope.

This material on milking equipment was sourced from the manual “Managing Milk Quality” published by ITA de La Pocatière.

### 7.4 WATER

Milk safety can be adversely affected by the quality of water used to clean milking equipment and the milk house. If the water is contaminated, the contaminants may cause milk safety to suffer. Since pasteurization does not kill 100% of bacteria in the milk, increasing the load of bacteria in the milk will increase the milk safety risk. Spore forming bacteria are usually found in dirty water. Spores can survive pasteurization and can reduce shelf-life of dairy products. The water used for cleaning milk contact surfaces can be a significant source of bacteria; therefore, testing the water is an important step in ensuring milk safety.



The components of water quality can be subdivided into two groups: contaminants and aesthetics.

**Contaminants** could affect the safety of the milk by residues of contaminated water left from cleaning the equipment. Contaminants can be either biological or chemical.

The **aesthetics** of water and the willingness of animals to drink it have an indirect effect on animal health, and, as a result, may impact the safety and quality of food produced from these animals. Characteristics that impact taste and colour are part of this group. Dirty water can smell and transfer odors to finished products.

### 7.4.1 Sources of Contaminants

Private wells may be recharged from areas on the same property as the farm or may extend to neighbouring properties. The activities of the farm, the homes on the farm, and the activities of neighbours can directly affect well water quality.

Many contaminants can enter water supplies and threaten the health and safety of families, livestock and the milking equipment rinsed with the contaminated water. The most common contaminants include:

- Pathogenic microorganisms (e.g. *E.coli* bacteria).
- Toxic chemicals such as pesticides, petroleum and solvents.
- Nitrates.

Most contaminated water is caused by:

- Contamination sources too close to the well or water source.
- Improper well construction.
- Inadequate well and system maintenance.
- Unused or improperly abandoned wells.

### 7.4.2 Water Quality Parameters and Testing

Contaminated water is not easily detected by taste, smell or colour. Testing is the only way to detect most contaminants and to ensure a safe water supply.

All water used for milking equipment sanitation, regardless of source, must be tested yearly for microbiological parameters (e.g. bacteria), which are determined by each provincial authority. The water sample should be collected as close as possible to the point of use (e.g. from the tap in the milk house), not from the source (e.g. from a well). Water quality is a provincial jurisdiction; therefore, each province sets potability standards for bacteria in its respective province.

Additional testing is recommended after events such as floods, spills or heavy rainfall or if colour, taste, or odour changes. Water should also be tested for nitrates and pesticides that are commonly used on or near the farm, especially if the area, well or

specific water source, has elevated nitrate levels or if pesticides have been detected in a neighbouring well or area.

Well owners should test for volatile organic compounds (VOCs) if petroleum or solvents have been spilled nearby or if the property is near an industrial site or landfill. Testing for volatile organic compounds is particularly important if an old underground fuel storage tank is near a well.

Producers who always sanitize milking equipment before milking still have to test their water. Sanitizing chemicals do kill bacteria, but higher bacteria loads and organic content, reduces their effectiveness.

### Testing Procedure:

To collect an appropriate sample to test water sources for bacteria, use the sterile bottles or bags provided by the local public health units or the laboratory that will perform the testing. Carefully follow the instructions provided by the laboratory. The water sample must be collected properly or the test results may not be valid.

### General Sample Collection Guidelines:

**Step 1. Collect from a tap or outlet in the water system that is** as close as possible to the point of use (e.g. from the tap in the milk house) for washing milk contact surfaces.

- If the system has not been in use for several days, run the water for 1–2 hours before taking the sample.
- If it is used daily, run the water for 5–10 minutes before taking the sample.

**Step 2. Immediately fill the container and cap it.**

- If a plastic container is used, its sides should be compressed to ensure the air is expelled.
- Make sure that you do not contaminate the inside of the container or cap with your fingers or place it on a surface.

**Step 3. Keep the sample refrigerated** and deliver it to a lab within 24 hours.

### General Testing Guidelines

- ✓ Sample water for bacterial contamination once a year, preferably after heavy rains or during wet seasons.
- ✓ If the sample is contaminated, the water source must be re-sampled and/or treated until the water source passes the microbiological parameters of the province.
- ✓ Keep or record the water test results. The Workbook contains a sample form (Record 15).
- ✓ Test any new well or after an existing well has been repaired.
- ✓ If a well has been disinfected, test it before using it for drinking or cleaning.

- ✓ Retest 1–3 weeks after the first test to confirm acceptable results.
- ✓ Test before using a well that has not been in use.
- ✓ Sample well for pH, iron content, bicarbonates etc. annually.

### 7.4.3 Interpreting Results of Water Quality Analysis

The results of the water analysis can be reported in different ways, depending on the laboratory. Be careful when comparing the results of analyses from individual laboratories to published 'normal' reference ranges, because the same methods may not have been used in the laboratory that determined the reference ranges.

Contact the laboratory that performed the testing on your water or your local authorities for the appropriate normal reference range.

### 7.4.4 Corrective Action When Water is Contaminated

When water samples fail to meet water quality objectives, the appropriate remedial action depends on the type and extent of the contamination. This usually requires a consultation with specialists in water supply and water treatment. The large water demands on most dairy farms usually mean that corrective measures suitable for domestic use are not practical for farms.

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where the water sample is contaminated. The workbook contains a sample form (Record 16). See Chapter 9 for more information.

You also must record whenever a problem occurs regarding water quality and what corrective actions were taken to remedy the situation. A sample form is in the Workbook.

## 7.5 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                                                  | SOURCE                                                                                                                                                                                                                       | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BIOLOGICAL</b>                                       |                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Bacteria on milk contact surfaces (including bulk tank) | <ul style="list-style-type: none"> <li>• Build-up of fat, protein or minerals on milking equipment and bulk tank interior</li> <li>• Improperly cleaned equipment (milking units, pipelines, receiving jar, tank)</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Regularly inspect all milk contact surfaces.</li> <li><input type="checkbox"/> Test water supply for provincial microbiological parameters annually.</li> <li><input type="checkbox"/> Establish a Standard Operating Procedure (SOP) for post milking system cleaning.</li> <li><input type="checkbox"/> Use approved cleaning products according to the accessible milk house wash charts.</li> </ul> |

## Canadian Quality Milk

| HAZARD                                               | SOURCE                                                                                                                                                                                                                                                                                                                                  | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                      | <ul style="list-style-type: none"> <li>Malfunctioning equipment</li> </ul>                                                                                                                                                                                                                                                              | <input type="checkbox"/> Have written plans outlining how to deal with a situation when: <ul style="list-style-type: none"> <li>Milk contact surfaces are found to be dirty.</li> <li>Pre-rinse or wash water is not the correct temperature.</li> </ul> <input type="checkbox"/> Check and record pre-rinse water (weekly) or wash water (monthly) <input type="checkbox"/> Have wash system evaluated annually. <input type="checkbox"/> Keep milk house and external surfaces of milking equipment clean. <input type="checkbox"/> Check detergent concentration regularly. <input type="checkbox"/> Check slugging action during equipment maintenance check. <input type="checkbox"/> Check timing of cleaning system during equipment maintenance check. <input type="checkbox"/> <b>See Chapter 11 and Workbook Chapter C.</b> |
| Bacteria in milk - microbes on milk contact surfaces | <ul style="list-style-type: none"> <li>Water supply contaminated with pathogenic bacteria effecting milking equipment sanitation</li> </ul>                                                                                                                                                                                             | <input type="checkbox"/> Test water supply for provincial microbiological parameters annually. <input type="checkbox"/> Ensure water meets provincial standards for bacteria. <input type="checkbox"/> Have a written plan to deal with a situation where water is shown to be contaminated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                      | <ul style="list-style-type: none"> <li>Dirty bulk truck milk transfer hose</li> </ul>                                                                                                                                                                                                                                                   | <input type="checkbox"/> Keep milk loading area free of manure contamination. <input type="checkbox"/> Equip hose port with tight-fitting door or self-closing cover. <input type="checkbox"/> Maintain a concrete or crushed stone apron outside the milk house directly under the hose port that is large enough to keep the milk hose off the ground and clean.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| CHEMICAL                                             |                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Contamination of milk with chemical residues         | <ul style="list-style-type: none"> <li>Cleaning solutions</li> <li>Pesticides (e.g. insecticides and rodenticides)</li> <li>Overuse of cleaning products</li> <li>Incomplete drainage of milking equipment (milk pipelines, receiver jar and bulk tank)</li> <li>Improper storage of chemicals</li> <li>Faulty safety switch</li> </ul> | <input type="checkbox"/> Use approved products according to accessible cleaning and sanitizing chart. <input type="checkbox"/> Install a safety switch or fail safe system or check function of existing one. <input type="checkbox"/> Have wash system evaluated annually. <input type="checkbox"/> Store chemicals in a location and manner that will not contaminate milk or meat. <input type="checkbox"/> Store in properly identified and labeled containers. <input type="checkbox"/> Use milk house exclusively for cooling and storing milk and for cleaning, sanitizing and storing materials and equipment used in the production and handling of milk.                                                                                                                                                                    |

## Canadian Quality Milk

| HAZARD                                      | SOURCE                                                                                                                                     | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                             |                                                                                                                                            | <input type="checkbox"/> Have a written plan on how to deal with a situation where pre-rinse or wash water has contaminated milk.<br><input type="checkbox"/> Inspect equipment to ensure all water is drained prior to milking.<br><input type="checkbox"/> Check pipeline for back slopes and adjust if necessary.<br><input type="checkbox"/> Have a written plan outlining how to deal with a situation when milk is contaminated.                                                                                                                                                                                                           |
| Mercury                                     | <ul style="list-style-type: none"> <li>Mercury vacuum gauge</li> </ul>                                                                     | <input type="checkbox"/> Replace with a suitable gauge.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Pesticides in water                         | <ul style="list-style-type: none"> <li>Spill or leak</li> <li>Back-siphoning of sprayer into well or water lines</li> </ul>                | <input type="checkbox"/> Only use registered products and follow label recommendations store.<br><input type="checkbox"/> Use anti-backflow devices on hoses.<br><input type="checkbox"/> Have a written plan outlining how to deal with a situation where water becomes contaminated with pesticides.<br><input type="checkbox"/> Store and use pesticides in a safe and secure manner in original containers in a manner that does not contaminate water.<br><input type="checkbox"/> Test water and verify source.<br><input type="checkbox"/> Properly locate pesticide handling facility.<br><input type="checkbox"/> <b>See Chapter 1.</b> |
| Volatile organic compounds in water         | <ul style="list-style-type: none"> <li>Fuel storage leak</li> <li>Workshops and machine sheds</li> <li>Industrial landfill</li> </ul>      | <input type="checkbox"/> Have a written plan on how to deal with a situation where your water source becomes contaminated.<br><input type="checkbox"/> Test water and verify source.<br><input type="checkbox"/> Contain and clean up spills.<br><input type="checkbox"/> Upgrade storage features.<br><input type="checkbox"/> Inspect and repair well casing.<br><input type="checkbox"/> Relocate well.                                                                                                                                                                                                                                       |
| PHYSICAL                                    |                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Contamination of milk with foreign material | <b>Milk house</b> <ul style="list-style-type: none"> <li>Broken glass</li> <li>Oil and dirt from compressors, vacuum pumps etc.</li> </ul> | <input type="checkbox"/> Protect lights near the man-hole of the bulk tank or ensure bulbs have a protective coating.<br><input type="checkbox"/> Operate and maintain equipment to reduce oil and dirt buildups, and if possible install in a separate utility room.                                                                                                                                                                                                                                                                                                                                                                            |

## 8.0 SHIPPING ANIMALS (CCP 3)

### Index:

|                                                  |
|--------------------------------------------------|
| Shipping Animals                                 |
| Summary of Hazards and Best Management Practices |



### Workbook Self-Evaluation Questions:

#### CCP 3 Shipping Animals

Shipping animals is the last control point where a producer can prevent animals carrying chemical residues and/or physical hazards (e.g. broken needles) from entering the human food chain. In order to ensure safe meat, animals containing chemical residues must not be shipped for human consumption. Instances where needles have been broken during livestock medicine administration and remain in the animals' muscles must be recorded. The animals' identification and information regarding the site of the broken needle should be passed on to the next buyer.

| <i>Reference Manual Chapter 8</i> |                                                                                                                                                                                                              |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>61.</b>                        | Do you always follow the recommended <b>meat</b> withdrawal times for: <ul style="list-style-type: none"> <li>• Livestock medicines?</li> <li>• Livestock pesticides?</li> <li>• Medicated feeds?</li> </ul> |
| <b>62.</b>                        | Do you have a Standard Operating Procedure in place to minimize the risk of shipping treated animals and animals carrying physical hazards (e.g. broken needles)? (Record 6)                                 |
| <b>63.</b>                        | Do you keep a record of any problems that have occurred regarding shipping animals and the corrective actions taken? (Record 17)                                                                             |

## Introduction

All Canadian dairy farmers are beef as well as milk producers, and, as such, must produce safe and wholesome beef. Shipping animals is another Critical Control Point in the Canadian Quality Milk program. This Critical Control Point has two hazards associated with it: chemical - livestock medicines and chemical residues (including any residues that may persist following vaccinations), and physical - broken needles. All animals leaving a dairy farm have the potential to be slaughtered for beef soon after sale.

### 8.1 SHIPPING ANIMALS

Animals are constantly being shipped from a dairy farm for a variety of reasons. Some cattle are culls due to reproductive problems, mastitis, lameness or other illnesses. Other cattle are sold as replacement stock for other herds. Bull calves are born on all dairy farms and are often sold to the veal industry or other buyers to end up as beef.

Whenever cattle are shipped, you have a responsibility to ensure that the animals are safe to enter the human food chain. Appropriate withdrawal times for livestock medicines and chemicals must be observed for any animals being sold or shipped directly to slaughter. As a result, when an animal is being shipped you must check to ensure that there are no chemical residues or broken needles in the animal. If the animal is carrying residues or a broken needle, then you must transfer that information to the next buyer or the transporter. See the Workbook for a sample shipping record.

Once cattle leave the dairy farm, they must be identified according to the National Livestock Identification for Dairy (NLID) standards or according to Agri-Tracabilité Québec (ATQ). You must ensure that all cattle intended for shipping are identified with NLID tags or Agri-Tracabilité Québec tags.

**Shipping animals is a Critical Control Point on a dairy farm because it is the last step in the process where you can control whether or not an animal carrying a chemical residue or broken needle is shipped, or whether the appropriate information is transferred to the next buyer or transporter.**

**Critical Control Point:** Shipping animals

**Hazards:** Chemical: livestock medicines, chemicals and biological products (e.g. vaccines)  
Physical: broken needles

**Critical Limits:** Chemical: negative on a recognized test by the federal or a provincial regulatory authority or, if animal is not intended for slaughter, treatment information is communicated to the next buyer.

Physical: zero tolerance or information of the broken needle is communicated to the next buyer.

**Control Measures:** Follow shipping animals Standard Operating Procedure and follow meat withdrawal times when shipping animals.

### Standard Operating Procedures:

To ensure that all personnel on a farm understand and follow the same procedures when shipping an animal, and to prevent animals with chemical residues or broken needles from entering the human food chain, establish an SOP for shipping animals in the Workbook describing the procedures that must be followed when shipping animals. The SOP must contain a step to ensure that cattle are identified according to CCIA (Canadian Cattle Identification Agency) standards (NLID) or Agri-Tracabilité Québec and it must contain enough information to ensure that someone shipping animals would not cause a hazard to milk or meat. You should consider the following Best Management Practices when you develop your own SOP, but **you must include the Best Management Practices that are shaded grey:**

- ✓ **Check the treatment records** to ensure animals have met the appropriate withdrawal times for milk and meat before shipping them (Record 10). Treatments include medicines, vaccines, veterinary Natural Health Products, pesticides, and medicated feeds. Some treatments have very long meat withdrawal times (especially if used extra-label), so ensure you check far enough back to ensure that withdrawals have been met.
- ✓ **Check the treatment records** to ensure animals do not have broken needles in them (Record 11).
- ✓ **Ensure animals are identified according to CCIA (NLID) standards or Agri-Tracabilité Québec.**
- ✓ If animals are going directly to slaughter, withdrawal times must be met **before** shipping. If animals carry broken needles, the information must be passed on to the next buyer. See Workbook for a sample shipping record.
- ✓ If animals carrying chemical residues or broken needles have to be shipped for one reason or another other than slaughter, you must **transfer the information** to the transporter or next buyer. You must communicate information on broken needles to the next buyer to avoid consumers finding needles in meat. A treatment record and/or log of the site of the broken needle and the animal's identification must accompany the animal. See Workbook for a sample shipping record.
- ✓ Alternatively, if an animal has been treated and the milk and meat withdrawal times have not been met, keep the animal until after the withdrawals and then ship.
- ✓ Ensure all individuals who work with dairy animals are aware of the SOP for shipping cattle and follow proper withdrawal periods and administration techniques (see Chapter 4). [Note: your SOP does not need to state this bullet; however, you still must do the practice.]

### Corrective Action:

To prepare for an emergency situation, you must have a written corrective action plan on how to communicate and address the situation where animals carrying a chemical residue or broken needle have accidentally been sold and the next buyer has not been informed. The Workbook contains a sample form (Record 16). See Chapter 9 for more information.

You also must record whenever a problem occurs while shipping animals (including cattle that have been condemned for the presence of residues) and what corrective action was taken to remedy the situation. A sample deviation and corrective action record is in the Workbook (Record 17).

### Records:

- ✓ Livestock treatment record required in BMP 7 for treating animals. A sample record is in the Workbook (Record 10).

## 8.2 SUMMARY OF HAZARDS AND BEST MANAGEMENT PRACTICES

| HAZARD                                                               | SOURCE                                                                                                                                              | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CHEMICAL</b>                                                      |                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Livestock medicine and chemical residues in milk and meat<br>(CCP 1) | Livestock medicines or chemicals <ul style="list-style-type: none"> <li>• Systemic</li> <li>• Intramammary</li> <li>• Topical treatments</li> </ul> | <input type="checkbox"/> Always follow the recommended meat and milk withdrawal times for livestock medicines, pesticides and medicated feeds.<br><input type="checkbox"/> Have an SOP in place for shipping animals.<br><input type="checkbox"/> Have a written plan on how to deal with a situation where an animal is shipped that contains chemical residues.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>PHYSICAL</b>                                                      |                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Broken needles in meat<br>(CCP3)                                     | <ul style="list-style-type: none"> <li>• Intramuscular and subcutaneous injection of livestock medicines</li> </ul>                                 | <input type="checkbox"/> Have a veterinarian remove the broken needle - if this is not possible; inform next buyer of broken needle.<br><input type="checkbox"/> Record the animal and site of broken needle.<br><input type="checkbox"/> Have a written plan to deal with the situation where a treated animal or an animal with a broken needle has been sold and the next buyer was not informed?<br><input type="checkbox"/> Use recommended tools and techniques when administering injections.<br><input type="checkbox"/> Ensure animal to be injected is properly restrained when injections are administered.<br><input type="checkbox"/> Use subcutaneous route to administer medications by injection if label permits. |

## 9.0 STAFF TRAINING AND COMMUNICATION (BMP 8)

### Index:

|                                                  |
|--------------------------------------------------|
| <b>Orientation</b>                               |
| <b>Training Staff</b>                            |
| <b>The Training Process</b>                      |
| <b>Communication and Corrective Action Plans</b> |

### Workbook Self-Evaluation Questions:

#### BMP 8 Staff Training & Communication

Good communication and regular updates are essential for staff and family members to ensure the safety and wholesomeness of food produced on dairy farms. Identifying each person's responsibilities clarifies a person's tasks and increases awareness of who is responsible when the person normally doing a job is not available.

| <b>Reference Manual Chapter 9</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>64.</b>                        | Do you: (Demerits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                   | <ul style="list-style-type: none"> <li>Regularly train staff to implement your CQM program?</li> <li>Train new staff to implement your CQM program?</li> <li>Ensure staff have access to Standard Operating Procedures, corrective action plans and records that you have developed and maintained?</li> </ul>                                                                                                                                                                                                                         |
| <b>65.</b>                        | Do you have a written corrective action plan on how to communicate and address: (Record 16)                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                   | <ul style="list-style-type: none"> <li>Incorrect administration of medications or other chemicals to an animal (BMP)?</li> <li>Entry of milk from a treated animal into the bulk milk tank (CCP)?</li> <li>Improperly cooled or stored milk (CCP)?</li> <li>Dirty milk contact surfaces (BMP)?</li> <li>Improper water temperature (BMP)?</li> <li>Milking equipment water contaminated with bacteria (BMP)?</li> <li>Sale of a treated animal or an animal with a broken needle and the next buyer was not informed (CCP)?</li> </ul> |

## Introduction

Staff have an important role in implementing any HACCP plan. A validator may interview staff during a validation; therefore, it is in a producer's best interest to train staff well.

### 9.1 ORIENTATION

Often new staff — employees and family members alike — are reluctant to ask too many questions at the start of a job for fear of embarrassment. By providing them with an orientation, you give them a chance to:

- Learn what you expect from them.
- Understand the layout and components of the operation.
- Appreciate the importance of their role in the dairy business.

To do this, consider providing them with a:

- Written explanation of their tasks, responsibilities and workplace policies.
- Tour of the operation to explain your production system as it relates to their jobs.
- Map – especially for new hired help.

### 9.2 TRAINING STAFF

Each person on the farm must be trained in the area of the program they are responsible for. For example, milkers must know and follow the milking Standard Operating Procedures, and staff who administer livestock treatments must know where the Corrective Action plans are in case they do something wrong. You must train your staff to ensure that staff understand and follow the Standard Operating Procedures and Corrective Action plans, and maintain the records applicable to their responsibilities. You also must update staff training, as is appropriate (e.g. Standard Operating Procedures or responsibilities change), and train new staff to implement your CQM program.

You also must ensure that Standard Operating Procedures, Corrective Action plans and records (including electronic records) are available at all times to staff and anyone who may eventually need to use them (e.g. relief milker).

Training has two major benefits, which are:

- Improved productivity and quality, because trained staff will:
  - Do the right thing the right way.
  - Waste less time and materials.
  - Offer new and better methods of doing things.

## Canadian Quality Milk

- Motivation and job satisfaction for staff, because training and ongoing managerial support will help them meet new challenges.

Even the best-planned program will not work unless hired help and family members understand the principles and practices of a HACCP-based system. Training helps staff learn:

- **Who** does what.
- **What** the:
  - Rules and policies are.
  - HACCP-based system is all about.
  - Standard operating procedures are.
  - Corrective action plans are.
- **When** SOPs and preventative best management practices are to be implemented and records kept.
- **Why** the HACCP-based system is important.
- **Where** the CCPs are in the operation.
- **How** to apply SOPs, corrective actions, etc.



Hiring and retaining a workforce can always bring new challenges. Hiring workers who do not speak your language or who have a different cultural background can bring about a variety of new issues and demands. Some things to consider are:

- Do not segregate staff who speak your language from those who do not. Staff morale will be better if you include all staff in training sessions and staff meetings – you may even find that during these sessions everyone learns new words and phrases from each other, which will improve every day communication.
- Be prepared to have a translator or someone on staff who can speak both languages present during training sessions and staff meetings. The meetings may be slow at first, but, over time, the benefits will outweigh any delays.
- Be aware that some cultures are more male-oriented and some workers may need time to adjust to having a female supervisor, or vice versa. Be prepared to give your staff time to adjust to you, as you will need time to adjust to them. Be patient and yet firm in your messaging.
- If you hire a group of foreign workers, depending on the culture, the group may develop a class-system within itself. Understanding this group dynamic will help you spot and solve problems before they gain momentum.
- Understand cultural needs and work with them, not against them. This will ensure things run more smoothly without any surprises, for example, some cultures require separate toilet facilities, while others may need time to accommodate religious needs. Knowing your “farm culture” and having a shared respect for these needs will ensure a happier, more successful workforce.

## 9.3 THE TRAINING PROCESS

- ✓ **Develop a training plan.** Work with your staff to develop the HACCP-based plan for your operation. Get their input on the CCPs, best management practices, corrective measures, standard operating procedures and record-keeping responsibilities.
- ✓ **Set objectives.** Clearly state the specific tasks your employee should be able to do after training.
- ✓ **Select training methods.** Training should progress from basic to complex in small, easy-to-master steps. Match the training method, including whether to provide individual or group instruction, to your employees' skill level.
- ✓ **Use the four-step method (Table 14) of Prepare, Present, Try out and Follow up.** Active involvement promotes learning: we learn by doing.
- ✓ **Evaluate the training.** Have the objectives been met? How does the staff feel? What are the 'bottom line' results or benefits? Are SOPs being practiced? Are records being kept? Are milk and meat safety indicators improving?
- ✓ **Update training.** Make sure all staff are given regular training updates according to any changes in the program.

**Table 14: THE FOUR-STEP METHOD OF TRAINING**

|                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Step 1 — Prepare</b> <ul style="list-style-type: none"> <li>• Put the learner at ease.</li> <li>• Find out what he or she already knows about the job.</li> <li>• Get him or her interested in learning the job.</li> <li>• Place him or her in the correct position.</li> </ul>                                  | <b>Step 2 — Present the operation</b> <ul style="list-style-type: none"> <li>• Tell, show, illustrate and question carefully and patiently.</li> <li>• Stress key points.</li> <li>• Instruct clearly and competently, one point at a time — but no more than the learner can master.</li> </ul>                 |
| <b>Step 3 — Try out performance</b> <ul style="list-style-type: none"> <li>• Test by having the learner perform the job. Have him or her tell and show you and explain key points.</li> <li>• Ask questions and correct errors.</li> <li>• Continue until you are satisfied that he or she knows the job.</li> </ul> | <b>Step 4 — Follow up</b> <ul style="list-style-type: none"> <li>• Put the learner on his or her own.</li> <li>• Check frequently. Designate someone who can help if needed. Get the learner to look for key points as he or she progresses.</li> <li>• Taper off extra coaching and close follow-up.</li> </ul> |

## 9.4 COMMUNICATION AND CORRECTIVE ACTION PLANS

Corrective action plans outline the steps family and staff should take to correct problems that may occur. Corrective action plans should contain detailed instructions and contact numbers.

To prepare for an emergency situation, you must have written corrective action plans on how to communicate and address the following situations. The Workbook contains a sample form (Record 16).

### 9.4.1 Medicines and Chemicals Used on Livestock:

You must have a written corrective action plan for incorrect administration of medications or other chemicals to an animal. Some possible actions are:

- Call a veterinarian to discuss withdrawal times and possible residue concerns.
- Call provincial regulatory authority for assistance.
- Use appropriate test kit to check for residues.
- If milk is unmarketable, dump the milk in an environmentally acceptable manner.
- Review and revise SOP control measures to avoid a reoccurrence.

**Reminder:** All problems that occur regarding animal treatments and the corrective actions taken must be recorded on Record 17 in the Workbook.

See Chapter 4, Section 4.4 for more information on administration of treatments.

### 9.4.2 Milking Treated Animals

You must have a written corrective action plan for the entry of milk from a treated animal into the bulk milk tank. Some possible actions are:

- Put a note in a prominent place on the bulk tank warning the driver not to pick up the milk.
- Notify the transporter.
- Call milk regulatory authority for assistance.
- Use appropriate test kit to check for residues. If the sample is positive, another sample may be sent to a laboratory for an official test.
- If milk is unmarketable, dump milk in an environmentally acceptable manner.
- Review and revise SOP and implementation to avoid a reoccurrence.

**Reminder:** All problems that occur regarding milk residues and the corrective actions taken must be recorded on Record 17 in the Workbook.

See Chapter 5, Section 5.2.3 for more information on milking treated animals.

### 9.4.3 Cooling and Storage of Milk

You must have a written corrective action plan for improperly cooled or stored milk. Some possible actions are:

- Check that the cooler is turned on.
- Clean the condenser radiator and ensure there is ample ventilation for the unit to cool.
- Adjust, replace or calibrate thermostat.
- Check refrigerant level yourself and/or call service dealer.
- Check accuracy of cooler thermometer with your own hand held thermometer or with the transporter's thermometer. Adjust, replace or calibrate accordingly.
- Call service repairman.
- Call milk regulatory authority for assistance.
- If milk is unmarketable, dump the tank of milk in an environmentally acceptable manner.
- Review and revise SOP control measures to avoid a reoccurrence.

**Reminder:** All problems that occur regarding cooling and storage of milk and the corrective actions taken must be recorded on Record 12 or Record 17 in the Workbook.

See Chapter 6, Section 6.1 for more information on cooling and storage of milk.

### 9.4.4 Equipment Sanitation

You must have a written corrective action plan for dirty milk contact surfaces. Some possible actions are:

- Verify the following with information on the posted milk house wash chart:
  - Check wash water temperatures. Adjust, repair or replace water heater if necessary.
  - Check chlorine concentrations of alkaline wash solution and sanitizer solution.
  - Check pH level of alkaline wash and acid rinse solution.
  - Check that the proper amount of chemicals is being added.
  - Check lengths of all cycles.
- Check slugging action yourself with appropriate equipment or call service dealer.
- Call service dealer if you are unable to perform the above procedures (including corrective actions) as a producer. A service dealer should perform a complete CIP Analysis.
- Call milk regulatory authority for assistance.

- Clean residue from milk contact services according to guidelines set out by the service dealer, milk regulatory authority or refer to chart “Troubleshooting Films and Deposits on Equipment” in Chapter 11.
- Review and revise SOP control measures to avoid a reoccurrence.
- The following procedure can be used to remove the old build-up of fat, mineral, and protein on your CIP system during the wash cycle:

Step 1. Let the system go through the hot wash cycle, doubling the amount of detergent and adding the same amount of chlorine sanitizer.

Step 2. Reset the system to a second hot wash cycle, but replace the detergent by three times the normal acid amount.

If equipment is still not clean, the process may have to be repeated.

**Remember: the sanitizer can only be mixed with the alkaline cleaner — never with the acid.**

NOTE: After repeated exposure to high concentrations of detergent, rubber parts (i.e. liners) may have to be replaced. High chlorine content breaks down the inner protective coat of the liner.

NOTE: Be vigilant in ensuring that the hot water system can deliver sufficient hot water to complete the above procedure.

**Reminder:** All problems that occur regarding equipment sanitation and the corrective actions taken must be recorded on Record 13 or Record 17 in the Workbook.

See Chapter 7, Section 7.1 for more information on equipment sanitation.

### 9.4.5 Water Temperature

You must have a written corrective action plan for improper water temperature. Some possible actions are:

- Check hot water heater to ensure it is functioning (e.g. one element may be burned out, faulty thermostat).
- Check if the bulk tank was previously washed; thereby, exhausting the hot water tank and using all of the available hot water. If this is the case, wait and then re-run the wash cycle and check to make sure the temperature is adequate.
- Check electrical breakers
- Repair or replace hot water heater.
- If the water heater works normally, call an equipment dealer to have the valves within the washer checked.

**Reminder:** All problems that occur regarding pre-rinse or wash water temperature and the corrective actions taken must be recorded on Record 13 or Record 17 in the Workbook.

See Chapter 7, Section 7.1 for more information on equipment sanitation.

### 9.4.6 Water Quality

You must have a written corrective action plan for when milking equipment water is contaminated with bacteria. Some possible actions are:

- Immediately contact local health unit or other competent authority for direction on appropriate action.
- Treat water accordingly and re-test to ensure it passes the microbial standards for the CQM program.
- Consider taking two samples for analysis, one sample from the source (e.g. a well) and one sample at the point of use. The test results may help you determine where the contamination is occurring. You may also want to remove any hoses or devices guiding the water into the sink and sample the water directly from the tap.
- Check well-head to ensure it is properly capped.
- Call milk regulatory authority, provincial health authority or a water specialist for assistance.
- Review and revise control measures to avoid a reoccurrence.

**Reminder:** All problems that occur regarding water quality and the corrective actions taken must be recorded on Record 15 or Record 17 in the Workbook.

See Chapter 7, Section 7.4 for more information on water quality.

### 9.4.7 Shipping Animals

You must have a written corrective action plan for the sale of a treated animal or an animal with a broken needle and the next buyer was not informed. Some possible actions are:

- Call the trucker or trucking company to inform them of the incident and animal identification.
- If you know where the animal was being shipped to or who purchased the animal, call the destination buyer and inform them of the incident and animal identification.
- Review and revise SOP control measures to avoid a reoccurrence.

**Reminder:** All problems that occur regarding shipping animals and the corrective actions taken must be recorded on Record 17 in the Workbook.

See Chapter 8, Section 8.1 for more information on shipping animals.

## 10.0 AUTOMATIC MILKING SYSTEMS

### Introduction

Additional information is required for Automatic Milking Systems (AMS). This chapter explains how producers with AMS can meet CQM requirements.

The chapter lists each CQM workbook question that has a different application for AMS and then describes the requirements. The CQM workbook questions not listed apply to AMS as written, and do not need any modification.

Please note that all CQM-required data must be easily accessible for validations.

#### Definitions:

**Bulk tank:** primary refrigerated tank that receives and stores milk.

**Buffer tank:** refrigerated tank that receives and stores milk when the bulk tank is being emptied or washed and until it has collected a sufficient volume of milk to move back to bulk tank without freezing the milk.

**Storage tank:** non-refrigerated tank that receives and stores milk while the bulk tank is being emptied or washed and until it has collected a sufficient volume of milk to move back to bulk tank without freezing the milk.

## 10.1 BMP 4 MEDICINES AND CHEMICALS USED ON LIVESTOCK

**Question 29: Do you mark all treated cattle in the milking herd that have milk withdrawals (e.g. leg bands)?**

With AMS, an acceptable method of identifying treated animals is entering the treated animal into the computer system; however, you must enter livestock medicine treatments into the computer, **before** you treat the animal. Your Standard Operating Procedure (SOP) for treating animals must also reflect this procedure.

**Question 31: Have you established and implemented a Standard Operating Procedure for treating cattle? (Record 5)**

Your SOP for treating cattle must state that you enter livestock medicine treatments into the computer **before** you treat the animal.

## 10.2 BMP 5 MILKING MANAGEMENT

### **Question 35: Have you established and implemented a Standard Operating Procedure for pre-milking? (Record 1)**

Since AMS run continually, your pre-milking SOP becomes your robot maintenance SOP. See Question 50.

### **Question 36: Have you established and implemented a Standard Operating Procedure for milking? (Record 2)**

See Question 50.

### **Question 37: Do you ensure that all teats are thoroughly cleaned, sanitized and dried (e.g. manure and teat dips removed) before milking, using approved products?**

See Question 50.

### **Question 38: Have you established and implemented a Standard Operating Procedure to minimize the risk of shipping abnormal milk? (Record 3)**

You have to demonstrate how you prevent abnormal milk (e.g. mastitic milk, colostrum, bloody milk) from entering the bulk tank. You should check conductivity reports for animals with abnormal milk. If any animals are identified as having abnormal milk, you should manually check her milk and keep it out of the bulk tank.

## 10.3 CCP1 MILKING TREATED ANIMALS

### **Question 39: Have you established and implemented a Standard Operating Procedure to minimize the risk of shipping milk from treated cattle? (Record 3)**

Your SOP must either have clear directions describing how staff should enter data in the computer to keep treated milk out of the bulk tank and how staff can access treated cattle information should they need to confirm treatments, or state that a trained person must always be available.

## 10.4 CCP2 COOLING AND STORAGE OF MILK

### **Question 43: Is the bulk tank temperature recorded and checked after every milking? (Record 12)**

Time temperature recorders are mandatory for AMS (both for the main bulk tank and the buffer tank), unless your AMS has alarms for milk temperature. If it does, the alarms must meet the CQM alarm parameters, and alarm events must be logged in the deviation and corrective action record (Record 17 in the Workbook). If milk is stored in

the buffer tank or storage tank for more than 2 hours, the buffer tank or storage tank must have a time temperature recorder as well. Manual temperature recording is not effective or practical for AMS. If your time temperature recorder does not have alarms, you must check the recorder a minimum of twice a day, with at least 8 hours between each check, and record the temperatures.

If you do not want to record data manually; the AMS or TTR must have the features outlined below:

**Please note:** Thermometers must be accurate within  $\pm 1^{\circ}\text{C}$ . This variation also applies to the temperatures listed below.

### Milk Temperature

a) For the bulk tank, the TTR or AMS must have:

- At least one year of alarm log easily accessible and available.
- An accurate, operating temperature probe to measure the temperature of the milk in the bulk tank.
- Alarms set to the following parameters:
  - Not alarm when bulk tank is empty or washing or just filling with the 1<sup>st</sup> milk.
  - Alarm if the temperature is not greater than  $0^{\circ}\text{C}$  and less than or equal to  $4^{\circ}\text{C}$  within 2 hours from the start of milk harvest (i.e. from the moment milk is diverted to the buffer or storage tank). If equipment is capable of detecting fractions of a degree, alarms may be set to a lower limit above  $0^{\circ}\text{C}$  to avoid nuisance alarms. Please note: the 2 hour delay includes the time that milk is in the buffer or storage tank.
  - Be able to set blend temperature alarms (i.e. after 2-hour delay from first milk harvest).
  - Alarm if the blend temperature ever goes above  $4^{\circ}\text{C}$  for longer than 15 consecutive minutes.

b) If milk is in the buffer or storage tank for longer than 2 hours, the additional TTR or AMS must have the ability to perform the same functions listed for the bulk tank in section 1(a), except that all references to “bulk tank” should read “buffer or storage tank”.

## 10.5 BMP6 FACILITY AND EQUIPMENT SANITATION

**Question 47: Do you regularly inspect and record the cleanliness of milking equipment (e.g. receiver jar and bulk milk tank) (minimum acceptable frequency is monthly, weekly is recommended)? (Record 13)**

See Question 50.

**Question 48: Do you check and record the temperature of the pre-rinse water (at least weekly) or wash water (at least monthly)? (Record 13)**

A time temperature recorder is recommended but you also can check and record the temperature manually. You have to be able to demonstrate to a validator how you take the temperature of either the pre-rinse or wash water.

If you do not want to record data manually; the AMS or TTR must have the features outlined below:

**Please note:** Thermometers must be accurate within  $\pm 1^{\circ}\text{C}$ . This variation also applies to the temperatures listed below.

### Pre-Rinse or Wash Water Temperature

The TTR or AMS must have:

- At least one year of alarm log easily accessible and available.
- A temperature probe to measure the temperature of the pre-rinse water or wash water.
- Alarms set to the following parameters:
  - **Pre-rinse alarms** must be set to the following parameters:
    - o Minimum of a weekly check.
    - o Temperature probe must be in the fill sink or on the return wash line.
    - o Temperature must be taken at the beginning or end of the cycle.
    - o Alarm must be triggered if the temperature drops more than  $5^{\circ}\text{C}$  below the accepted range.

**OR**

- **Wash alarms** must be set to the following parameters:
  - o Temperature can be taken at the beginning or end of the cycle.
  - o TTRs usually check the wash temperature every wash, but the CQM requirement is a minimum of a monthly check.
  - o Whether start or end temperature taken, the temperature must conform to the specifications on the cleaning and sanitizing chart as filled out by the equipment dealer.
  - o Probe can be in either the fill sink or on the return wash line.
  - o If using an alarm and measuring temperature at the beginning of the wash cycle, alarm must be triggered if the temperature drops more than  $5^{\circ}\text{C}$  below the accepted range.

- o If using an alarm and measuring temperature at the end of the wash cycle, alarm must be triggered if the temperature drops more than 10°C below the accepted range.

Note: the alarms for the wash water are intended to monitor the milking equipment, not the bulk tank.

### **Question 50: Have you established and implemented a Standard Operating Procedure for post-milking system cleaning? (Record 4)**

For an AMS, the post-milking SOP becomes your SOP for cleaning and maintaining an AMS.

### **Standard Operating Procedure for Cleaning and Maintaining an Automatic Milking System**

To ensure that milk is cooling properly and that the equipment is cleaned adequately, An Automatic Milking System cleaning SOP is an important part of your CQM program. The SOP must contain enough information to ensure that a relief farm worker can perform the steps.

The following are various elements that should be included in your AMS Cleaning SOP.

- ✓ **Describe how the robot is programmed to wash, sanitize and rinse.** For example, some robots are programmed to run a complete wash 3 times a day, to rinse the teat cups after every cow or every 10 cows are milked, and to rinse and sanitize if idle for more than 45 minutes and after every treated cow is milked.
- ✓ **Check the cleaning of the system once per day.**
  - Check to ensure there were no cleaning or milk temperature alarms in both the main and buffer tank (time temperature recorders, etc.) or attention lists (slow cooling of milk, too long between washes, abnormal milk, etc.) or exception reports.
  - Check the inflations, sanitary trap and receiver jar.
  - Check the air bleeds on each quarter unit.
  - Check the level of the soaps and other chemicals used (e.g. teat spray) weekly.
- ✓ **Clean the outside of the AMS and surrounding area once per day.**
  - Scrub with soap and clean components of the milking system.
  - Clean the robot room floor daily.
  - Check and clean the laser periodically during the day while the robot is not in use.

- ✓ **Check and record the temperature of the pre-rinse water (weekly) or wash water (monthly)** (Record 13).
- ✓ **Check and record the cleanliness of milking equipment regularly** (e.g. receiver jar and bulk milk tank) (minimum acceptable frequency is monthly, weekly is recommended).
- ✓ **Change the filter.**
  - Describe how to shut the system down and change the filter.
  - Change the filter at the start of washing at least twice per day.
  - Check the filter for signs of mastitis and other debris. If you identify a problem, ensure that you follow corrective actions.
- ✓ **Check the buffer tank and main bulk tank.**
  - Post a milk pick-up/cleaning procedure for the milk truck drivers. The instructions should include how to switch diversion from the main tank to the buffer tank, how to start the wash for the main tank and how to start the cooler for the buffer tank.
  - Inspect the main bulk tank whenever it is empty to make sure it is clean (drying the bulk tank milk contact surfaces may help you detect deficiencies in surface cleaning).
  - Follow the same wash procedures for the buffer tank after milk transfer to the main tank, including sanitizing approximately prior to its use (if possible, check the main tank and the buffer tank when they are dry).
  - Sanitize the buffer tank about half an hour before the milk truck arrives.
- ✓ **Teat Cleaning.**
  - Observe teat cleaning and post spraying/dipping of one animal for each milking unit at least once a day.
  - Check that roller brushes are clean.

Clean teats remain a concern with AMS. AMS are capable of cleaning, sanitizing and drying teats, but they may not do it well. Cattle in an AMS herd may be expected to be kept cleaner to reduce the incidence of dirty teats. The Hygiene Scoring Card in Chapter 1 of the Reference Manual shows you how to score the cleanliness of your cattle's udders.

### **Question 55: Do you have a functioning safety switch or fail-safe system in place to avoid accidental entry of wash water into the tank?**

An AMS does not have a safety switch but it must have a fail-safe system to keep antibiotic milk and wash water out of the tank. The device is also designed to err on the side of dumping clean milk if there is a malfunction.

## 10.6 BMP8 STAFF TRAINING AND COMMUNICATION

Question 64: Do you:

- Regularly train staff to implement your CQM program?
- Train new staff to implement your CQM program?
- Ensure that staff have access to Standard Operating Procedures, corrective action plans and records that you have developed and maintained?

Staff training is even more important for people working on a farm with an AMS than on a farm with a manual milking system. Staff training is essential to ensure that everyone working with the AMS understands how to keep the system working effectively and how to ensure that milk is kept as clean and safe as possible.

## **11.0 MILK AND MEAT QUALITY AND SAFETY TROUBLESHOOTING GUIDES**

### **Index:**

|                                                             |
|-------------------------------------------------------------|
| <b>Antibiotic and Other Residues in Milk and Dairy Beef</b> |
| <b>High Bacteria Counts</b>                                 |
| <b>Films and Deposits on Equipment</b>                      |
| <b>Mastitis and High Somatic Cell Counts (SCCs)</b>         |

These guides are meant to identify corrective actions when a problem occurs. Within the guides are references to other chapters within this manual where additional information can be found.

## 11.1 Troubleshooting Antibiotic and Other Residues in Milk and Dairy Beef

| CAUSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SOLUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Milk from treated animals enters bulk tank or animals are shipped for slaughter before end of withdrawal time:</b></p> <ul style="list-style-type: none"> <li>• No permanent written records of treatments</li> <li>• Forgetting animal was treated</li> <li>• Poor identification of treated animals</li> <li>• Poor communication between person who treated and person who milks or ships animals</li> <li>• All milk from all quarters of treated animal not kept out</li> <li>• Milking used as a vacuum source to milk treated animal when using trap bucket to withhold milk</li> <li>• Separate milker unit for treated animals not used</li> <li>• Milker unit not cleaned properly between treated &amp; untreated animals</li> <li>• Dry &amp; treated animals not separated from the milking herd</li> </ul> | <p><input type="checkbox"/> keep a permanent record of all treatments - see <b>Workbook, Chapter C</b> for examples</p> <p><input type="checkbox"/> Mark all treated animals in an easily recognized manner</p> <p><input type="checkbox"/> Post treatment information on a message or bulletin board to ensure people milking are aware of treated animals and appropriate withdrawals</p> <p><input type="checkbox"/> Discard milk from all quarters of treated animals</p> <p><input type="checkbox"/> Check with equipment supplier to see whether present pulsator can be adapted to provide vacuum to trap bucket</p> <p><input type="checkbox"/> Milk treated animals last or with separate equipment to ensure no contaminated milk can enter the milk supply</p> <p><input type="checkbox"/> Check all cull animals records before shipping to ensure withdrawal dates are met</p> <p><input type="checkbox"/> Thoroughly clean milker unit between treated and untreated animals</p> <p><input type="checkbox"/> Use antibiotic test where appropriate</p> <p><input type="checkbox"/> Separate dry cows from the milking herd</p> |
| <p><b>Prolonged drug withdrawal time because antibiotics used in extra-label fashion:</b></p> <ul style="list-style-type: none"> <li>• Antibiotic drugs used at a higher dosage and/or more frequently than label instructions</li> <li>• Livestock medicines administered by a route different from label recommendations</li> <li>• Antibiotic drugs not approved for use in lactating dairy cattle are used</li> <li>• Purchasing cattle that have been treated</li> </ul>                                                                                                                                                                                                                                                                                                                                                  | <p><input type="checkbox"/> Make a permanent record of all treatments - see <b>Workbook, Chapter C</b> for examples</p> <p><input type="checkbox"/> Use only approved livestock medicines, and use only according to label instructions or according to a veterinarian's prescription</p> <p><input type="checkbox"/> Use appropriate antibiotic tests</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Canadian Quality Milk

| CAUSES                                                                                                                                    | SOLUTIONS                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Dry cows that have been dry-treated calve earlier than withdrawal time on label</li> </ul>       | <input type="checkbox"/> Confirm date of dry-off treatment of freshened cattle to determine whether adequate withdrawal time has been observed<br><input type="checkbox"/> Consult your herd veterinarian for advice on appropriate withdrawal times<br><input type="checkbox"/> Use antibiotic test kits where appropriate |
| <ul style="list-style-type: none"> <li>• Feeding medicated feeds</li> </ul>                                                               | <input type="checkbox"/> Medicated feeds for non-lactating dairy cattle should be stored separate from the milking herd feeds<br><input type="checkbox"/> Remove all traces of medicated feed from storage and feed handling equipment                                                                                      |
| <ul style="list-style-type: none"> <li>• Animals' udders treated with antibiotic ointments, salves and sprays</li> </ul>                  | <input type="checkbox"/> Use only approved products<br><input type="checkbox"/> Follow recommended withdrawal times                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>• Antibiotic residue being secreted even after the approved withdrawal time is observed</li> </ul> | <input type="checkbox"/> Check all treated animals with an appropriate test                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>• Foot baths with medicated solutions used to combat infectious diseases of the feet</li> </ul>    | <input type="checkbox"/> Use only according to a veterinarian's prescription                                                                                                                                                                                                                                                |

For more information on preventing residues in milk and meat, see Chapters 4, 5 and 8.

## 11.2 Troubleshooting High Bacteria Counts

| CAUSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SOLUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>A) MILK COOLING</b></p> <ul style="list-style-type: none"> <li>• Improperly adjusted or malfunctioning thermostat</li> <li>• Inaccurate or malfunctioning thermometer</li> <li>• Improperly working or sized pre-cooler</li> <li>• Inadequate milk volume on first milking for proper agitation</li> <li>• cooler not turned on for first milking</li> <li>• inefficient cooling to greater than 0°C and less than or equal to 4°C (34°F to 40°F)</li> </ul> <p>⇒ Takes &gt;2 hours after 1<sup>st</sup> milking and &gt;1 hr after 2<sup>nd</sup> and subsequent milkings</p> <p>⇒ Blend temperature rises above 10°C (50°) during 2<sup>nd</sup> and subsequent milkings</p> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Adjust, replace or calibrate thermostat</li> <li><input type="checkbox"/> Adjust, replace or calibrate thermometer</li> <li><input type="checkbox"/> Call service dealer</li> <li><input type="checkbox"/> Check if service dealer can adjust paddle</li> <li><input type="checkbox"/> Change bulk tanks</li> <li><input type="checkbox"/> Review pre-milking practices clean condenser radiator</li> <li><input type="checkbox"/> Ensure proper ventilation for condenser radiator</li> <li><input type="checkbox"/> Check refrigerant level</li> <li><input type="checkbox"/> Call service dealer for assistance</li> <li><input type="checkbox"/> Check cooling and sanitation — <b>see Chapter 6</b></li> <li><input type="checkbox"/> Install a pre-cooler unit</li> </ul> |
| <p><b>B) MILKING MANAGEMENT</b></p> <ul style="list-style-type: none"> <li>• Dirty hands</li> <li>• Unclean teats/udders</li> <li>• Milking area floors unclean during milking</li> <li>• Unit drop-offs during milking</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure hands are clean before and during milking</li> <li><input type="checkbox"/> Wear nitrile/latex gloves</li> <li><input type="checkbox"/> Review udder preparation — <b>see Chapter 5</b></li> <li><input type="checkbox"/> Manage manure properly — <b>see Chapter 1</b></li> <li><input type="checkbox"/> Restrict animal access to unclean areas</li> <li><input type="checkbox"/> Adequate stall sizes</li> <li><input type="checkbox"/> Adequate bedding and proper stall maintenance</li> <li><input type="checkbox"/> Check cattle environment: outdoors and indoors — <b>see Chapter 1</b></li> <li><input type="checkbox"/> Wash dirty units if when they have fallen</li> </ul>                                                                                  |

## Canadian Quality Milk

| CAUSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | SOLUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <input type="checkbox"/> Keep floors as clean as possible at all times<br><input type="checkbox"/> Check milking equipment — <b>see Chapter 7</b><br><input type="checkbox"/> Call service dealer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Sections C, D and E (below) GENERAL UNCLEAN MILK CONTACT SURFACES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <input type="checkbox"/> <b>See information below and Chapter 7</b><br><input type="checkbox"/> <b>See sample records in Workbook Chapter C</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>C) WASH SYSTEM ANALYSIS</b> <ul style="list-style-type: none"> <li>Incorrect wash charts ⇒ not enough chemicals to properly clean equipment</li> <li>Unclean CIP milk contact surfaces</li> <li>Wash sink drain not closing properly</li> </ul>                                                                                                                                                                                                                                                                                                                               | <input type="checkbox"/> Have the service dealer update the chart and have it posted in the milk house<br><input type="checkbox"/> <b>See Section D below and Chapter 7</b><br><input type="checkbox"/> Call service dealer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>D) WASH CYCLE ANALYSIS</b> <ol style="list-style-type: none"> <li>Pre-rinse             <ul style="list-style-type: none"> <li>Start and/or end temperatures are too low</li> </ul> </li> <li>Wash             <ul style="list-style-type: none"> <li>pH is <u>not</u> between 11.0 to 12.0</li> <li>Chlorine concentration below 75 PPM</li> <li>Starting temperature too low</li> <li>Ending temperature too low</li> <li>Circulation time too long or too short</li> <li>Water volume too low — milker units or intake pipe ‘suck air’ in wash sink</li> </ul> </li> </ol> | <ol style="list-style-type: none"> <li>Pre-rinse             <ul style="list-style-type: none"> <li><input type="checkbox"/> Ensure water heater is adjusted and working properly</li> <li><input type="checkbox"/> Ensure start temperature is 35 to 60°C (95 to 140°F)</li> <li><input type="checkbox"/> Ensure end temperature is no less than 35°C (95°F)</li> </ul> </li> <li>Wash             <ul style="list-style-type: none"> <li><input type="checkbox"/> Have chemical supplier/service dealer test pH</li> <li><input type="checkbox"/> Have chemical supplier/service dealer test chlorine PPM</li> <li><input type="checkbox"/> Ensure start temperature is 71°C (160°F)</li> <li><input type="checkbox"/> Ensure ending temperature is no lower than 43°C (110°F)</li> <li><input type="checkbox"/> For tie stall/stanchion barn systems - check posted wash chart — generally 5 to 10 minutes is time needed<br/>manual water fill: fill sink so milker units have at least 2 to 3 inches of water over the teat cups at all times</li> </ul> </li> </ol> |

## Canadian Quality Milk

| CAUSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | SOLUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3. Acid rinse</p> <ul style="list-style-type: none"> <li>Starting and ending pH &gt;3.5</li> </ul> <p>4. Pre-milking sanitize</p> <ul style="list-style-type: none"> <li>Starting temperature is incorrect</li> <li>Chlorine concentration is too low</li> </ul> <p>5. Equipment function</p> <ul style="list-style-type: none"> <li>Equipment not functioning properly for proper cleaning, e.g., poor “slugging” action</li> <li>Poor system design e.g. dead ends</li> </ul> | <p><input type="checkbox"/> CIP water fill: call service dealer to adjust water volume</p> <p>3. Acid rinse</p> <p><input type="checkbox"/> Ensure pH is less than 3.5 — have chemical supplier/service dealer test pH</p> <p><input type="checkbox"/> Ensure water temperature complies with manufacturers’ recommendations as posted on wash chart (some acids use cold water)</p> <p>4. Pre-milking sanitize</p> <p><input type="checkbox"/> Ensure temperature is 43°C (110°F)</p> <p><input type="checkbox"/> Ensure starting concentration is 200 ppm — have chemical supplier/service dealer test ppm level</p> <p>5. Equipment function</p> <p><input type="checkbox"/> Call service dealer for performance check</p> <p><input type="checkbox"/> Have an thorough, annual equipment maintenance check</p> <p><input type="checkbox"/> Ensure minimum 20 slugs/wash with a flow rate of 7-10 m/sec or 23-33 ft./sec</p> <p><input type="checkbox"/> <b>See Chapter 7</b></p> <p><input type="checkbox"/> <b>See Workbook Chapter C</b></p> |

## Canadian Quality Milk

| CAUSES                                                                                                                                                                                                                                                                                                                                                                              | SOLUTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E) MANUAL WASH</b> <ul style="list-style-type: none"> <li>• Milk surfaces are not clean</li> <li>• Not all cleaning cycles completed (pre-rinse, wash, acid rinse and sanitize)</li> <li>• Not enough chemicals used</li> <li>• Improper cleaning chemicals used</li> <li>• Worn out cleaning brushes</li> <li>• Milk residue allowed to dry on milk contact surfaces</li> </ul> | <input type="checkbox"/> <b>See Chapter 11 “Films and Deposit”</b><br><input type="checkbox"/> Perform all cycles for proper cleaning<br><input type="checkbox"/> Refer to wash chart — <b>see sample in Workbook Chapter C</b><br><input type="checkbox"/> Use only approved dairy cleaners and sanitizers<br><input type="checkbox"/> Replace as recommended by service dealer<br><input type="checkbox"/> Wash bulk tank immediately after milk is removed<br><input type="checkbox"/> Wash milking system immediately after milking |
| <b>F) WATER QUALITY</b> <ul style="list-style-type: none"> <li>• Non-potable water used</li> </ul>                                                                                                                                                                                                                                                                                  | <input type="checkbox"/> Use only potable water<br><input type="checkbox"/> Have a water sample taken to check for bacteria levels — <b>see Chapter 7</b><br><input type="checkbox"/> Take water sample directly from tap (remove hose before taking sample)                                                                                                                                                                                                                                                                            |
| <b>G) EQUIPMENT</b> <ul style="list-style-type: none"> <li>• Worn/deteriorated liners/rubber parts</li> </ul>                                                                                                                                                                                                                                                                       | <input type="checkbox"/> Abide by a strict change schedule<br><input type="checkbox"/> Use cleaning chemicals according to manufacturers recommendations                                                                                                                                                                                                                                                                                                                                                                                |

## 11.3 Troubleshooting Films and Deposits on Equipment

| FILM OR DEPOSIT             | DESCRIPTION                                                                                                          | CAUSE                                                                                                                                                                                      | REMOVAL                                                                                                                                                                            | PREVENTION                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mineral, calcium, magnesium | <ul style="list-style-type: none"> <li>White (water-stone), chalky to gray</li> </ul>                                | <ul style="list-style-type: none"> <li>Improper rinsing</li> <li>Dropout of minerals from water supply</li> <li>No acidified rinse</li> </ul>                                              | <ul style="list-style-type: none"> <li>Acid wash with hot water (double up on label rate)</li> </ul>                                                                               | <input type="checkbox"/> Use acid rinse regularly<br><input type="checkbox"/> Make sure that alkaline product used has good water-conditioning properties<br><input type="checkbox"/> Use water softener                                                                                                                                |
| Iron                        | <ul style="list-style-type: none"> <li>Brown to red</li> </ul>                                                       | <ul style="list-style-type: none"> <li>Water supply</li> <li>Aggressive supply system components</li> <li>No acidified rinse</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Acid wash with hot water</li> </ul>                                                                                                         | <input type="checkbox"/> Use regular effective acid rinse<br><input type="checkbox"/> Treat water<br><input type="checkbox"/> Properly select sanitizers                                                                                                                                                                                |
| Inking (blackening)         | <ul style="list-style-type: none"> <li>Black rubber parts</li> </ul>                                                 | <ul style="list-style-type: none"> <li>Reaction between chlorine or chlorinated compound and rubber</li> </ul>                                                                             | <ul style="list-style-type: none"> <li>Acid wash with hot water — if not removed, replace</li> </ul>                                                                               | <input type="checkbox"/> Use acid rinse<br><input type="checkbox"/> Ensure proper dry storage<br><input type="checkbox"/> Chlorine overuse                                                                                                                                                                                              |
| Black                       | <ul style="list-style-type: none"> <li>Black residue deposit</li> </ul>                                              | <ul style="list-style-type: none"> <li>Rubber migration</li> <li>Contact of dissimilar materials</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>Acid wash with hot water — if not removed, replace</li> </ul>                                                                               | <input type="checkbox"/> Use acid rinse<br><input type="checkbox"/> Ensure proper dry storage<br><input type="checkbox"/> Chlorine overuse                                                                                                                                                                                              |
| Protein                     | <ul style="list-style-type: none"> <li>Blue– rainbow hue, varnish like apple sauce</li> </ul>                        | <ul style="list-style-type: none"> <li>Using non-chlorinated cleaner</li> <li>Inadequate pre-rinse</li> <li>Improper (sporadic or periodic) cleaning</li> <li>Too hot pre-rinse</li> </ul> | <ul style="list-style-type: none"> <li>Initial cleanup with equal parts of chlorine and a chlorinated alkaline detergent with hot water — double up on label usage rate</li> </ul> | <input type="checkbox"/> Use a chlorinated alkaline detergent<br><input type="checkbox"/> Clean with appropriate dilution during each cleaning cycle<br><input type="checkbox"/> Adequately pre-rinse with warm (38° to 43°C or 100° to 110°F) water<br><input type="checkbox"/> Pre-rinse before milk film dries on equipment surfaces |
| Milkstone or waterstone     | <ul style="list-style-type: none"> <li>White to yellow</li> </ul>                                                    | <ul style="list-style-type: none"> <li>Mineral from milk</li> <li>Mineral from water</li> <li>No acidified rinse</li> </ul>                                                                | <ul style="list-style-type: none"> <li>Initial cleanup with a chlorinated alkaline detergent with hot water — double-up on label usage rate</li> <li>Acid wash</li> </ul>          | <input type="checkbox"/> Use regular and proper cleaning procedures coupled with acid rinse<br><input type="checkbox"/> Use a periodic acid wash in addition to the normal cleaning cycle                                                                                                                                               |
| Fat/grease                  | <ul style="list-style-type: none"> <li>Hanging water droplets with greasy (white) appearance</li> <li>Oil</li> </ul> | <ul style="list-style-type: none"> <li>Improper pre-rinse (cold water) temperatures</li> <li>Low final temperature during cleaning cycle</li> </ul>                                        | <ul style="list-style-type: none"> <li>Initial cleanup with a chlorinated alkaline detergent with hot water — double up on label usage rate</li> </ul>                             | <input type="checkbox"/> Use regular and proper cleaning procedures, coupled with acidified rinse<br><input type="checkbox"/> Use warm (38°C to 49°C or 100°F to                                                                                                                                                                        |

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| FILM OR DEPOSIT | DESCRIPTION                                                                                                               | CAUSE                                                                                                                                                                                  | REMOVAL                                                                                                                                                                  | PREVENTION                                                                                                                                                                                               |
|-----------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                 |                                                                                                                           | <ul style="list-style-type: none"> <li>• Improper detergent concentration</li> <li>• Regular use of acids during washing cycle</li> <li>• Pulsator oil on equipment surface</li> </ul> |                                                                                                                                                                          | 120°F) pre-rinse water<br><input type="checkbox"/> Properly clean with proper use of dilution during each cleaning cycle<br><input type="checkbox"/> Ensure wash water does not drop below 43°C or 110°F |
| Factory soil    | <ul style="list-style-type: none"> <li>• Grease, factory dirt-black deposit, rusting</li> </ul>                           | <ul style="list-style-type: none"> <li>• Improper or no initial cleanup</li> </ul>                                                                                                     | <ul style="list-style-type: none"> <li>• Initial cleanup with equal parts of chlorine and a chlorinated alkaline detergent with hot water — double label rate</li> </ul> | <input type="checkbox"/> Thoroughly clean equipment before using it initially                                                                                                                            |
| Corrosion       | <ul style="list-style-type: none"> <li>• Rust, pitting</li> </ul>                                                         | <ul style="list-style-type: none"> <li>• Iron, tramp metal particles, improper chemical usage</li> </ul>                                                                               | <ul style="list-style-type: none"> <li>• Acid wash and abrasive action</li> <li>• Re-polishing (buffing) if advanced corrosion</li> </ul>                                | <input type="checkbox"/> Use proper cleaning procedures and passivating acid                                                                                                                             |
| Etching         | <ul style="list-style-type: none"> <li>• Pitted and white discolouration 'imbedded' in stainless steel surface</li> </ul> | <ul style="list-style-type: none"> <li>• Improper use of chemicals</li> </ul>                                                                                                          | <ul style="list-style-type: none"> <li>• Re-polish</li> </ul>                                                                                                            | <input type="checkbox"/> Use proper cleaning procedures and passivating acid rinse                                                                                                                       |
| Plastics —      |                                                                                                                           |                                                                                                                                                                                        |                                                                                                                                                                          |                                                                                                                                                                                                          |
| Opaque          | <ul style="list-style-type: none"> <li>• Foggy, white not clear</li> </ul>                                                | <ul style="list-style-type: none"> <li>• Improper draining, moisture absorption</li> </ul>                                                                                             | <ul style="list-style-type: none"> <li>• Exposure to heat and/or sunlight</li> </ul>                                                                                     | <input type="checkbox"/> Use blower or dryer<br><input type="checkbox"/> Ensure good drainage                                                                                                            |
| Yellow          | <ul style="list-style-type: none"> <li>• Yellow colour</li> </ul>                                                         | <ul style="list-style-type: none"> <li>• Old age, improper use of iodophors, hand soil stain</li> </ul>                                                                                | <ul style="list-style-type: none"> <li>• None</li> </ul>                                                                                                                 | <input type="checkbox"/> Apply product properly                                                                                                                                                          |
| Brown, black    | <ul style="list-style-type: none"> <li>• Brown discolouration</li> </ul>                                                  | <ul style="list-style-type: none"> <li>• Rubber migration, carbon from dryer motors</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li>• Acid wash — if not removed, replace</li> </ul>                                                                                  | <input type="checkbox"/> Use acid rinse regularly<br><input type="checkbox"/> Use proper filtration<br><input type="checkbox"/> Segregate plastics and rubber                                            |
| Red             | <ul style="list-style-type: none"> <li>• Red colour, stain</li> </ul>                                                     | <ul style="list-style-type: none"> <li>• <i>Serratia marcescens</i></li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>• None</li> </ul>                                                                                                                 | <input type="checkbox"/> Use proper cleaning procedures regularly                                                                                                                                        |
| Pink, purple    | <ul style="list-style-type: none"> <li>• Pink to purple colour</li> </ul>                                                 | <ul style="list-style-type: none"> <li>• <i>Streptococcus rubriticuli</i></li> </ul>                                                                                                   | <ul style="list-style-type: none"> <li>• Strong alkaline wash</li> </ul>                                                                                                 | <input type="checkbox"/> Use proper cleaning procedures regularly                                                                                                                                        |

• Films and deposits are caused in part by poor procedures (improper cleaning, rinsing, etc.) and by incompatible products. In mechanical cleaning, problems may also be due to malfunction of the system or lack of proper solution control.

• Source: *The Professional's Approach to Quality Milk Production*. Dr. David Reid and Dr. Andy Johnson, 1993.

## 11.4 Troubleshooting Mastitis and High Somatic Cell Counts (SCCs)

### Identify Animals with Mastitis

- Individual SCCs
- Clinical case records
- Past culture results
- California Mastitis Test results
- Abnormal milk & udders

### Identify Cause of Mastitis

- Clinical cases as they occur
- Culture high SCC animals
- Culture quarter/composite milk samples of all animals

### Contagious Infection

- *Staph. aureus*
- *Strep. agalactiae*
- *Mycoplasma bovis*

### Solutions

#### Prevent New Cases

- Use proper infusion techniques
- Clean and sanitize the teats and dry with a single service towel
- Pre-dip and dip all teats with a licensed product after milking (see chapter 5)
- Wear nitrile or latex gloves
- Segregate infected animals
- Reduce teat end vacuum fluctuation

#### Reduce Teat End Exposure to Bacteria

- Keep all bedding clean and dry
- Calve cattle in clean dry box stalls
- Maintain dry cows and springing heifers in a clean and dry environment (see chapter 1)

### Caution

- Analyze individual SCC reports but be aware that most environmental mastitis cases last only a few days and can be missed between tests

#### Prevent New Cases

- Milk clean dry teats
- Reduce teat end vacuum fluctuations
- Treat all cattle at dry off
- Use proper infusion techniques
- Consider a vaccination program

#### Remove Source of Infection

- Treat all cattle at dry off
- Cull cattle with incurable infections
- Screen all purchased cattle for mastitis (see chapter 3)
- Work with your vet on selecting animals to treat during lactation

## 12.0 LIST OF ABBREVIATIONS AND GLOSSARY OF TERMS

|                       |                                            |
|-----------------------|--------------------------------------------|
| <b>AMS</b>            | Automatic Milking Systems                  |
| <b>ATQ</b>            | Agri-Tracabilité Quebec                    |
| <b>BMPs</b>           | Best Management Practices                  |
| <b>BRSV</b>           | Bovine Respiratory Syncytial Virus         |
| <b>BVD</b>            | Bovine Viral Diarrhea                      |
| <b>CCP</b>            | Critical Control Point                     |
| <b>CFIA</b>           | Canadian Food Inspection Agency            |
| <b>CIP</b>            | Clean In Place                             |
| <b>CMT</b>            | California Mastitis Test                   |
| <b>DIN</b>            | Drug Identification Number                 |
| <b>HACCP</b>          | Hazard Analysis and Critical Control Point |
| <b>IBR</b>            | Infectious Bovine Rhinotracheatitis        |
| <b>IM</b>             | Intramuscular                              |
| <b>IMM</b>            | Intramammary                               |
| <b>IU</b>             | Intrauterine                               |
| <b>IV</b>             | Intravenous                                |
| <b>MRL</b>            | Maximum Residue Limit                      |
| <b>MSD</b>            | Material Safety Data Sheets                |
| <b>NLID</b>           | National Livestock Identification program  |
| <b>PI<sub>3</sub></b> | Parainfluenza 3 Virus                      |
| <b>SCC</b>            | Somatic Cell Count                         |
| <b>SOPs</b>           | Standard Operating Procedures              |
| <b>VOCs</b>           | Volatile Organic Compounds                 |
| <b>OR</b>             | Oral                                       |
| <b>Pr</b>             | Prescription drug                          |
| <b>SQ/SC</b>          | Subcutaneous                               |
| <b>TP</b>             | Topical                                    |
| <b>TSE</b>            | Transmissible Spongiform Encephalopathy    |
| <b>vNHP</b>           | Veterinary Natural Health Product          |
| <b>WD</b>             | Withdrawal                                 |

# Glossary

| Word or Phrase                   | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Audit*                           | A systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled.                                                                                                                                                                                                                                                                                                                                                                                                     |
| Auditor*                         | A person with the competence to conduct an audit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Best Management Practices (BMPs) | <p>BMPs are equivalent to prerequisite programs of HAACP and describe the production processes. The CQM program has 8 major BMP subject areas, which are:</p> <ol style="list-style-type: none"> <li>1. Dairy Facilities, Pesticides and Nutrient Management</li> <li>2. Feed</li> <li>3. Animal Health and Biosecurity</li> <li>4. Medicines and Chemicals Used on Livestock</li> <li>5. Milking Management</li> <li>6. Facility and Equipment Sanitation</li> <li>7. Use of Water for Cleaning Milk Contact Surfaces</li> <li>8. Staff Training and Communication</li> </ol> |
| Buffer tank                      | Refrigerated tank that receives and stores milk when the bulk tank is being emptied or washed and until it has collected a sufficient volume of milk to move back to bulk tank without freezing the milk.                                                                                                                                                                                                                                                                                                                                                                      |
| Bulk tank                        | Primary refrigerated tank that receives and stores milk.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Control (noun)                   | The state wherein correct procedures are being followed and criteria are being met.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Control (verb)                   | To take all necessary actions to ensure and maintain compliance with criteria established in the HAACP plan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Control Measures                 | Actions and activities that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Corrective Actions*              | <p>Action to eliminate the cause of a detected nonconformity or other undesirable situation.</p> <p>Note 1: there can be more than one cause for a nonconformity.</p> <p>Note 2: Corrective action is taken to prevent recurrence whereas preventive action is taken to prevent occurrence.</p> <p>Note 3: There is a distinction between correction and corrective action.</p>                                                                                                                                                                                                |
| Critical Control Point (CCP)     | A point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable levels.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Critical Limit                   | A criterion which separates acceptability from unacceptability.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Canadian Quality Milk

| Word or Phrase                | Definition                                                                                                                                                                                                                                                                        |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Deviation                     | Failure to meet required critical limits for a critical control point.                                                                                                                                                                                                            |
| Deviation Procedure           | Predetermined and documented set of corrective actions, which are implemented when a deviation occurs.                                                                                                                                                                            |
| Hazard                        | Biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.                                                                                                                                                            |
| Hazard Analysis               | Process of identifying hazards, their characteristics and how they can best be prevented and/or controlled in the production process.                                                                                                                                             |
| Inspection                    | Conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging.                                                                                                                                                                 |
| Monitoring                    | The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control and to produce an accurate record.                                                                                                        |
| Prerequisites Program         | Universal steps or procedures that control the operational conditions within a food establishment (or livestock production unit) allowing for environmental conditions that are favourable to the production of safe food. BMPs are equivalent to prerequisite programs of HACCP. |
| Registration                  | Process through which a producer becomes recognized as conforming to the CQM program requirements.                                                                                                                                                                                |
| Risk                          | Estimate of the likely occurrence of a hazard.                                                                                                                                                                                                                                    |
| Standard Operating Procedures | Written procedures that describe step-by-step how various production processes should be carried out. For livestock producers these often outline specific steps of BMPs.                                                                                                         |
| Storage tank:                 | Non-refrigerated tank that receives and stores milk while the bulk tank is being emptied or washed and until it has collected a sufficient volume of milk to move back to bulk tank without freezing the milk.                                                                    |
| Validation                    | Same as "Audit."                                                                                                                                                                                                                                                                  |
| Validator                     | Same as "Auditor."                                                                                                                                                                                                                                                                |
| Verification                  | The application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP system.                                                                                                                                     |

\* Reference: International Standard ISO 9000:2000(E) Second Edition: Quality management systems – Fundamentals and vocabulary.

Other references:

- Adapted from Manitoba On-Farm Food Safety GPP website  
[www.gov.mb.ca/agriculture/foodsafety/gpp/gloss\\_ref.pdf](http://www.gov.mb.ca/agriculture/foodsafety/gpp/gloss_ref.pdf)
- Adapted from Canadian Food Inspection System website  
[www.inspection.gc.ca/english/ppc/psps/haccp/manu/manue.shtml](http://www.inspection.gc.ca/english/ppc/psps/haccp/manu/manue.shtml)

## APPENDIX I: HAZARDS INDEX

| HAZARD                                               | SOURCE                                                                                                                                                                                                                                                           | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BIOLOGICAL</b>                                    |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Environmental bacteria                               | <ul style="list-style-type: none"> <li>• Dirty teat and udders</li> <li>• Dirty hands</li> <li>• Contaminated milking equipment</li> <li>• Infected animal(s)</li> </ul>                                                                                         | <ul style="list-style-type: none"> <li><input type="checkbox"/> Establish a SOP for pre-milking.</li> <li><input type="checkbox"/> Establish a SOP for milking.</li> <li><input type="checkbox"/> Ensure teats are cleaned, sanitized and dried.</li> <li><input type="checkbox"/> Establish an SOP for milking animals with abnormal milk.</li> <li><input type="checkbox"/> Discard abnormal milk.</li> <li><input type="checkbox"/> Use single-service towels to prep teats.</li> <li><input type="checkbox"/> Ensure the environment is clean.</li> <li><input type="checkbox"/> Practice personal hygiene.</li> <li><input type="checkbox"/> Sanitize milking units.</li> <li><input type="checkbox"/> Segregate cattle.</li> <li><input type="checkbox"/> Milk infected cattle separately.</li> <li><input type="checkbox"/> Forestrip and milk-out properly.</li> <li><input type="checkbox"/> Examine udder.</li> <li><input type="checkbox"/> Teat-dip after milking.</li> <li><input type="checkbox"/> <b>See Chapter 5.</b></li> </ul>                                                                                                                                                                                                                                                           |
| Bacteria in milk - microbes on milk contact surfaces | <ul style="list-style-type: none"> <li>• Build-up of fat, protein or minerals on milking equipment and bulk tank interior</li> <li>• Improperly cleaned equipment (milking units, pipelines, receiving jar, tank)</li> <li>• Malfunctioning equipment</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Regularly inspect all milk contact surfaces.</li> <li><input type="checkbox"/> Test water supply for provincial microbiological parameters annually.</li> <li><input type="checkbox"/> Establish a Standard Operating Procedure (SOP) for post milking system cleaning.</li> <li><input type="checkbox"/> Use approved cleaning products according to the accessible milk house wash charts.</li> <li><input type="checkbox"/> Have written plans outlining how to deal with a situation when: <ul style="list-style-type: none"> <li>• Milk contact surfaces are found to be dirty.</li> <li>• Pre-rinse or wash water is not the correct temperature.</li> </ul> </li> <li><input type="checkbox"/> Check and record pre-rinse water (weekly) or wash water (monthly).</li> <li><input type="checkbox"/> Have wash system evaluated annually.</li> <li><input type="checkbox"/> Keep milk house and external surfaces of milking equipment clean.</li> <li><input type="checkbox"/> Check detergent concentration regularly.</li> <li><input type="checkbox"/> Check slugging action during equipment maintenance check.</li> <li><input type="checkbox"/> Check timing of cleaning system during equipment maintenance check.</li> </ul> |

## Canadian Quality Milk

| HAZARD                                               | SOURCE                                                                                                                                                                                                                                   | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                      |                                                                                                                                                                                                                                          | <input type="checkbox"/> <b>See Chapters 7 and 10.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                      | <ul style="list-style-type: none"> <li>Water supply contaminated with pathogenic bacteria effecting milking equipment sanitation</li> </ul>                                                                                              | <input type="checkbox"/> Test water supply for provincial microbiological parameters annually.<br><input type="checkbox"/> Ensure water meets provincial standards for bacteria.<br><input type="checkbox"/> Have a written plan to deal with a situation where water is shown to be contaminated.<br><input type="checkbox"/> <b>See Chapter 7.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                      | <ul style="list-style-type: none"> <li>Dirty bulk truck milk transfer hose</li> </ul>                                                                                                                                                    | <input type="checkbox"/> Keep milk loading area free of manure contamination.<br><input type="checkbox"/> Equip hose port with tight-fitting door or self-closing cover.<br><input type="checkbox"/> Maintain a concrete or crushed stone apron outside the milk house directly under the hose port that is large enough to keep the milk hose off the ground and clean.<br><input type="checkbox"/> <b>See Chapter 1.</b>                                                                                                                                                                                                                                                                                                                                                                              |
| Post harvest sources of bacteria in bulk tank (CCP2) | <ul style="list-style-type: none"> <li>Slow cooling</li> <li>Malfunctioning equipment</li> </ul>                                                                                                                                         | <input type="checkbox"/> Check and record milk temperature <u>after</u> every milking.<br><input type="checkbox"/> Have a written plan outlining how to deal with a situation where milk has been improperly cooled or stored.<br><input type="checkbox"/> Check and record bulk tank temperature before every milking.<br><input type="checkbox"/> Add or maintain a pre-cooler.<br><input type="checkbox"/> Have the cooling system evaluated annually by industry professional.<br><input type="checkbox"/> <b>See Chapter 6.</b>                                                                                                                                                                                                                                                                    |
| Contamination of milk with bacteria                  | <ul style="list-style-type: none"> <li>Manure and sewage sludge                             <ul style="list-style-type: none"> <li>- All environments</li> </ul> </li> <li>Exercise yards</li> <li>Traffic areas and laneways</li> </ul> | <input type="checkbox"/> Make sure animal husbandry, manure and waste management systems facilitate clean udders of lactating cattle.<br><input type="checkbox"/> Restrict cattle access to manure storage, run-off areas, muddy areas and surface water.<br><input type="checkbox"/> Ensure farm has the necessary approvals/permits required to use sewage sludge.<br><input type="checkbox"/> Follow stated withdrawal times after application of sewage wastes.<br><input type="checkbox"/> Follow withdrawal times after application of manure.<br><input type="checkbox"/> Design exercise yards for animal safety and cleanliness.<br><input type="checkbox"/> Divert clean water.<br><input type="checkbox"/> Ensure laneways and milk loading area are free of manure at time of milk pick-up. |

## Canadian Quality Milk

| HAZARD                                                       | SOURCE                                                                                                                                                        | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                              | <ul style="list-style-type: none"> <li>- Pasture areas</li> <li>- Stalls – design, base and bedding</li> </ul>                                                | <ul style="list-style-type: none"> <li><input type="checkbox"/> Install proper cattle crossings</li> <li><input type="checkbox"/> Construct and maintain proper lanes and traffic areas.</li> <li><input type="checkbox"/> Assess stocking rates and reduce grazing intensity where necessary.</li> <li><input type="checkbox"/> Evenly distribute manure.</li> <li><input type="checkbox"/> Design stalls for cattle safety, comfort and cleanliness.</li> <li><input type="checkbox"/> Use best available stall base.</li> <li><input type="checkbox"/> Use recommended stall bedding materials.</li> <li><input type="checkbox"/> <b>See Chapter 1.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                          |
|                                                              | <ul style="list-style-type: none"> <li>• Insects and vermin</li> </ul>                                                                                        | <ul style="list-style-type: none"> <li><input type="checkbox"/> Establish an insect and vermin control program.</li> <li><input type="checkbox"/> Keep all exterior doors, windows and openings closed or fitted with screens to prevent entry of pests.</li> <li><input type="checkbox"/> Ensure exterior doors are tight-fitting and self-closing.</li> <li><input type="checkbox"/> Trap floor drains to prevent entry of odours, insects or rodents.</li> <li><input type="checkbox"/> Keep exterior of building clean and in good repair, and eliminate all potential fly breeding and feeding grounds.</li> <li><input type="checkbox"/> <b>See Chapter 1.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                |
| Pathogens (bacterial, viral and TSE's) and parasites in feed | Contaminating feed supply: <ul style="list-style-type: none"> <li>• Ruminant by-products</li> <li>• Manure</li> <li>• Pathogens from sewage sludge</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Store and handle feeds designated not for use for ruminants and pet foods to avoid feeding those feeds to cattle or cross-contaminating feeds for cattle.</li> <li><input type="checkbox"/> Ensure cattle do not have access to and are not fed pet foods or feeds that are labeled not for use for ruminants.</li> <li><input type="checkbox"/> Store and handle pet foods and feeds that are labeled not for use for ruminants separately from ruminant feed.</li> <li><input type="checkbox"/> Maintain a biosecurity program for feed supply.</li> <li><input type="checkbox"/> Ensure feed facilities, equipment and feeding methods minimize manure contamination.</li> <li><input type="checkbox"/> Follow stated withdrawal times before grazing or harvesting crops treated with sewage sludge or manure.</li> <li><input type="checkbox"/> Control vermin.</li> <li><input type="checkbox"/> <b>See Chapters 1 and 2.</b></li> </ul> |
| Communicable disease (from people)                           | <ul style="list-style-type: none"> <li>• Dirty hands and clothing</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li><input type="checkbox"/> Practice personal hygiene.</li> <li><input type="checkbox"/> Wear disposable gloves.</li> <li><input type="checkbox"/> <b>See Chapter 5.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Canadian Quality Milk

| HAZARD                                                            | SOURCE                                                                                                                                                                                                                                                                                                                                   | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Colostrum                                                         | <ul style="list-style-type: none"> <li>Recently freshened cows/heifers</li> </ul>                                                                                                                                                                                                                                                        | <input type="checkbox"/> Do not add milk to bulk tank from animals 15 days prior to calving or 3 days after calving.<br><input type="checkbox"/> <b>See Chapter 5.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Chemical</b>                                                   |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Livestock medicine or chemical or vNHPs residues in milk and meat | <ul style="list-style-type: none"> <li>Any treatments with livestock medicines</li> </ul>                                                                                                                                                                                                                                                | <input type="checkbox"/> Identify all cattle according to National Livestock Identification (NLID) or Agri-Tracabilité Québec.<br><input type="checkbox"/> Identify all cattle (e.g. ear tag) so that treatment records can be maintained.<br><input type="checkbox"/> Buy residue-free animals from a reliable source.<br><input type="checkbox"/> <b>See Chapter 3.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                   | <ul style="list-style-type: none"> <li>Livestock medicines or chemicals or vNHPs improperly stored</li> <li>Improper use of livestock medicines or chemicals or vNHPs                             <ul style="list-style-type: none"> <li>Systemic</li> <li>Intramammary</li> <li>Topical treatments</li> <li>Feed</li> </ul> </li> </ul> | <input type="checkbox"/> Store and handle livestock medicines in a way that will not contaminate milk, meat or feeds.<br><input type="checkbox"/> Store livestock treatments and needles in a clean and sanitary manner and according to label directions.<br><input type="checkbox"/> Store medicines and chemicals intended for use in non-lactating and lactating dairy cattle and products not intended for dairy cattle in separate cupboards, shelves or areas (if on same shelf).<br><input type="checkbox"/> Use only livestock medicines (including medicated foot baths) approved in Canada for use in dairy cattle.<br><input type="checkbox"/> Use livestock medicines and pesticides according to the label or written instructions from a veterinarian or use products listed in <b>Section 5</b> of the Permitted Substances Lists for Livestock Production (CAN/CGSB-32.311-2006) according to the specifications indicated.<br><input type="checkbox"/> Create a drug listing or catalogue of all medications and chemicals used on livestock including product name and storage location.<br><input type="checkbox"/> Mark all treated cattle in the milking herd that have milk withdrawals (e.g. leg bands).<br><input type="checkbox"/> Maintain a permanent written record of livestock treatments.<br><input type="checkbox"/> Have an SOP for treating animals.<br><input type="checkbox"/> Have a corrective action plan in case an animal is treated incorrectly.<br><input type="checkbox"/> <b>See Chapter 4.</b> |

## Canadian Quality Milk

| HAZARD                                                           | SOURCE                                                                                                | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | <ul style="list-style-type: none"> <li>Medicated feeds and/or feed additives</li> </ul>               | <ul style="list-style-type: none"> <li><input type="checkbox"/> If medicated feeds are fed, have an SOP in place on how to feed medicated feed.</li> <li><input type="checkbox"/> If medicated feeds are received, mark bins.</li> <li><input type="checkbox"/> Follow storage and administration Best Management Practices required for all medications, including recommended milk withdrawal times for all medicated feed.</li> <li><input type="checkbox"/> Ensure that your feed supplier has a valid medicated feed license for any medicated feed used on farm (Pending legislation).</li> <li><input type="checkbox"/> Ensure feed manufacturers and suppliers use an HACCP-based system.</li> <li><input type="checkbox"/> Prevent cross-contamination of feed.</li> <li><input type="checkbox"/> Clearly mark feed bins.</li> <li><input type="checkbox"/> Keep samples of incoming feeds and ingredients.</li> <li><input type="checkbox"/> <b>See Chapters 3 and 4.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Livestock medicine and chemical residues in milk and meat (CCP1) | <ul style="list-style-type: none"> <li>Any treatment with livestock medicines or chemicals</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Have an SOP in place to milk cattle with abnormal or treated milk.</li> <li><input type="checkbox"/> Have an SOP in place for shipping animals.</li> <li><input type="checkbox"/> Follow recommended milk withdrawal times for medicines, pesticides and medicated feed.</li> <li><input type="checkbox"/> When an animal calves or aborts, check withdrawal time on treatment records.</li> <li><input type="checkbox"/> Test milk from new animals entering the herd before shipping their milk or get a letter of guarantee from the person selling the animal.</li> <li><input type="checkbox"/> Have a written plan on how to deal with a situation where treated milk enters the bulk tank.</li> <li><input type="checkbox"/> Have a written plan on how to deal with a situation where an animal is shipped that contains chemical residues.</li> <li><input type="checkbox"/> Milk treated animals last or with separate equipment.</li> <li><input type="checkbox"/> Post treatment information on a message board to ensure people milking cattle are aware of which animals have been treated.</li> <li><input type="checkbox"/> Have a program in place to minimize the risk of contaminating the bulk tank with milk from treated animals (e.g. milk last).</li> <li><input type="checkbox"/> <b>See Chapters 3, 4, 8, 10, and 11.</b></li> </ul> |

## Canadian Quality Milk

| HAZARD                                                                       | SOURCE                                                                                                                                                                                      | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pesticides<br>e.g. insecticides,<br>rodenticides, avicides<br>and herbicides | <ul style="list-style-type: none"> <li>Treated pasture or crops</li> <li>Milk house and barns</li> <li>Treated seed</li> <li>Backflow into hoses used to fill pesticide sprayers</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Use only pesticides registered for use in pastures, forages, milk houses and barns in those respective areas.</li> <li><input type="checkbox"/> Follow all pesticide label directions and watch for "Days to Grazing" or "Days to Harvest" warnings.</li> <li><input type="checkbox"/> Use an anti-backflow device on hoses connected to milk house and barn water supply.</li> <li><input type="checkbox"/> Maintain a valid, up-to-date pesticide safety certificate where required.</li> <li><input type="checkbox"/> Keep accurate records of pesticides used.</li> <li><input type="checkbox"/> Properly locate pesticide handling facility.</li> <li><input type="checkbox"/> Communicate effectively with family and staff at all times about residue hazards.</li> <li><input type="checkbox"/> Prevent cross-contamination of feeds.</li> <li><input type="checkbox"/> Use labs and test kits for suspected contaminants.</li> <li><input type="checkbox"/> Store and use pesticides in a safe and secure manner in original containers in a manner that does not contaminate water.</li> <li><input type="checkbox"/> Have a written plan outlining how to deal with a situation where water becomes contaminated with pesticides.</li> <li><input type="checkbox"/> Test water and verify source.</li> <li><input type="checkbox"/> <b>See Chapter 1.</b></li> </ul> |
|                                                                              | <ul style="list-style-type: none"> <li>Improper pesticide storage</li> </ul>                                                                                                                | <ul style="list-style-type: none"> <li><input type="checkbox"/> Store pesticides and treated seed in a safe and secure manner in original containers, away from livestock access, feed, feed storage and milking equipment.</li> <li><input type="checkbox"/> Store treated seeds separately from feed ingredients.</li> <li><input type="checkbox"/> <b>See Chapter 1.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                              | <ul style="list-style-type: none"> <li>Spill or leak</li> </ul>                                                                                                                             | <ul style="list-style-type: none"> <li><input type="checkbox"/> Follow proper spill cleanup procedures.</li> <li><input type="checkbox"/> <b>See Chapter 1.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Volatile organic compounds in water                                          | <ul style="list-style-type: none"> <li>Fuel storage leak</li> <li>Workshops and machine sheds</li> <li>Industrial landfill</li> </ul>                                                       | <ul style="list-style-type: none"> <li><input type="checkbox"/> Have a written plan on how to deal with a situation where your water source becomes contaminated.</li> <li><input type="checkbox"/> Test water and verify source.</li> <li><input type="checkbox"/> Contain and clean up spills.</li> <li><input type="checkbox"/> Upgrade storage features.</li> <li><input type="checkbox"/> Inspect and repair well casing.</li> <li><input type="checkbox"/> Relocate well.</li> <li><input type="checkbox"/> <b>See Chapter 7.</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Fertilizers                                                                  | <ul style="list-style-type: none"> <li>Spilled bulk fertilizer</li> <li>Cross-contamination</li> </ul>                                                                                      | <ul style="list-style-type: none"> <li><input type="checkbox"/> Store fertilizers in a safe and secure manner in original containers, away from livestock access, feed storage and milking equipment.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Canadian Quality Milk

| HAZARD                                       | SOURCE                                                                                                                                                                                                                                                                                                                                  | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | <ul style="list-style-type: none"> <li>Mixing errors</li> </ul>                                                                                                                                                                                                                                                                         | <input type="checkbox"/> Clean-up spills.<br><input type="checkbox"/> Apply fertilizer only at recommended rates.<br><input type="checkbox"/> Calibrate application equipment.<br><input type="checkbox"/> Harrow re-distributed fertilizer.<br><input type="checkbox"/> <b>See Chapter 1.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Wood preservatives                           | <ul style="list-style-type: none"> <li>Treated lumber</li> </ul>                                                                                                                                                                                                                                                                        | <input type="checkbox"/> Do not use treated lumber for feed bunk surfaces, stall bases, or platform of free stalls.<br><input type="checkbox"/> Do not store feed in contact with treated lumber.<br><input type="checkbox"/> Do not use bedding made from treated materials.<br><input type="checkbox"/> <b>See Chapter 1.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Contamination of milk with chemical residues | <ul style="list-style-type: none"> <li>Cleaning solutions</li> <li>Pesticides (e.g. insecticides and rodenticides)</li> <li>Overuse of cleaning products</li> <li>Incomplete drainage of milking equipment (milk pipelines, receiver jar and bulk tank)</li> <li>Improper storage of chemicals</li> <li>Faulty safety switch</li> </ul> | <input type="checkbox"/> Use approved products according to accessible cleaning and sanitizing chart.<br><input type="checkbox"/> Install a safety switch or fail safe system or check function of existing one.<br><input type="checkbox"/> Have wash system evaluated annually.<br><input type="checkbox"/> Store chemicals in a location and manner that will not contaminate milk or meat.<br><input type="checkbox"/> Store in properly identified and labeled containers.<br><input type="checkbox"/> Use milk house exclusively for cooling and storing milk and for cleaning, sanitizing and storing materials and equipment used in the production and handling of milk.<br><input type="checkbox"/> Have a written plan on how to deal with a situation where pre-rinse or wash water has contaminated milk.<br><input type="checkbox"/> Inspect equipment to ensure all water is drained prior to milking.<br><input type="checkbox"/> Check pipeline for back slopes and adjust if necessary.<br><input type="checkbox"/> Have a written plan outlining how to deal with a situation when milk is contaminated.<br><input type="checkbox"/> <b>See Chapter 7.</b> |
|                                              | <ul style="list-style-type: none"> <li>Improper removal of udder washes, teat dips and udder salves from teats before milking</li> </ul>                                                                                                                                                                                                | <input type="checkbox"/> Ensure teats are cleaned and dried.<br><input type="checkbox"/> Use an approved teat sanitizing product and use it according to the label directions.<br><input type="checkbox"/> Follow label directions when preparing udder washes and teat dips.<br><input type="checkbox"/> <b>See Chapter 5.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Mercury                                      | <ul style="list-style-type: none"> <li>Mercury vacuum gauge</li> </ul>                                                                                                                                                                                                                                                                  | <input type="checkbox"/> Replace with a suitable gauge.<br><input type="checkbox"/> <b>See Chapter 7.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Canadian Quality Milk

| HAZARD                                      | SOURCE                                                                                                                                     | BEST MANAGEMENT PRACTICES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHYSICAL                                    |                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Contamination of milk with foreign material | <b>Milk house</b> <ul style="list-style-type: none"> <li>Broken glass</li> <li>Oil and dirt from compressors, vacuum pumps etc.</li> </ul> | <input type="checkbox"/> Protect lights near the man-hole of the bulk tank or ensure bulbs have a protective coating<br><input type="checkbox"/> Operate and maintain equipment to reduce oil and dirt build-ups, and if possible install in a separate utility room.<br><input type="checkbox"/> <b>See Chapter 7.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Broken needles in meat (CCP3)               | <ul style="list-style-type: none"> <li>Intramuscular and subcutaneous injection of livestock medicines</li> </ul>                          | <input type="checkbox"/> Record the animal and site of the broken needle.<br><input type="checkbox"/> Have a veterinarian remove the broken needle — if this is not possible; inform packing plant or next buyer of broken needle.<br><input type="checkbox"/> Have a written plan to deal with the situation where a treated animal or an animal with a broken needle has been sold and the next buyer was not informed?<br><input type="checkbox"/> Use recommended tools and techniques when administering injections.<br><input type="checkbox"/> Ensure animal to be injected is properly restrained.<br><input type="checkbox"/> Use subcutaneous route to administer medications by injection if label permits.<br><input type="checkbox"/> Buy animals from a reliable source that do not contain broken needles.<br><input type="checkbox"/> <b>See Chapters 3, 4 and 8.</b> |