
GPP 7 -- FEED AND WATER: HANDLING AND PROCESSING

A. WATER QUALITY AND SAFETY PROGRAM

Water is the single most important nutrient for livestock. Animals, as well as humans, can live for long periods of time without food. Without water, however, death can occur in a matter of days. Unfortunately, the safety, quality and quantity of the water provided for livestock is often overlooked.

Water, especially surface water, can contain many biological and chemical hazards. Other livestock, wildlife or industrial activity farther upstream can contaminate water coming into the production unit via natural watercourses.

As part of the receiving process, water containment areas or watercourses travelling through livestock production premises such as pastures should be evaluated for potential biological and chemical hazards from local or upstream sources. When there is reason for concern, appropriate measures should be taken. This may include an evaluation of the hazard, fencing to keep potential hazards away from livestock or treatment of the water if it is possible.

An adequate and potable (within limits for chemical and microbiological hazards) water supply for drinking and cleaning must be available for livestock production. Water safety and quality is determined by analyses of water samples. A bacterial analysis indicates if water contains micro-organisms, such as bacteria, which may be harmful. A chemical analysis will determine the mineral or heavy metal content of water.

Water safety and quality tests should be conducted and documented at least once per year or as indicated by previous history, water source and experience. Treatment of water is to be carried out as indicated when it is from other (non-municipal) sources for drinking and cleaning.

Appropriate facilities for storage (dugouts & lagoons) and distribution of water for use by the livestock operation needs to be maintained. Measures should be taken to prevent or reduce surface water contamination by other animals such as deer and beaver.

Part of the water safety and quality program should include the control of non-potable water (for example, fire control and manure water) and its separation from potable water systems. There has to be adequate drainage and disposal of wastewater. Surface water that is or may become contaminated and then unsuitable for livestock production use should be adequately drained and or fenced off. During the summer grazing season, blue-green algae toxin may make some water sources unsuitable for use. Vigilance for possible toxin problems should be exercised.

1. **TABLE 1: CANADIAN WATER QUALITY GUIDELINES FOR LIVESTOCK**

The 1987 Canadian Task Force on Water Quality has established water quality guidelines. They provide a guide for the maximum recommended limits of the most common chemicals found in water.

CHEMICAL	MAXIMUM RECOMMENDED LIMIT mg/L
Major Ions	
Calcium	1,000.0
Nitrate and nitrite	100.0
Nitrite alone	10.0
Sulphate	1,000.0
Total Dissolved Solids (TDS)	3,000.0
Heavy Metals and Trace Ions	
Aluminium	5.0
Arsenic	0.5*
Beryllium	0.1**
Boron	5.0
Cadmium	0.02
Chromium	1.0
Cobalt	1.0
Copper (swine)	5.0
Fluoride	2.0***
Iron	no guideline
Lead	0.1
Manganese	no guideline
Mercury	0.003
Molybdenum	0.5
Nickel	1.0
Selenium	0.05
Uranium	0.2
Vanadium	0.1
Zinc	50.0

Source: Task Force on Water Quality Guidelines, 1987

* 5.0 if not added to feed

** Tentative guideline

*** 1.0 if fluoride present in feed

When surface water is used as a source of water, it should be made accessible to livestock so that minimal disturbance of the supply occurs. This may include a fenced or gravelled approach to the water to reduce the risk of soil and faecal contamination. A waterer and pump system to the water storage area may be the best way to reduce faecal contamination from dugouts.

When the water supply is of poor quality in terms of large amounts of dissolved solids, **Table 2** can be used as a guide to determine if the water can be used for livestock production. Water samples with Total Dissolved Solids in excess of 5,000 mg/L will begin to be of concern to livestock producers. Refer to the Table for more specific details.

2. TABLE 2: A GUIDE TO THE USE OF POOR QUALITY WATER FOR LIVESTOCK

TOTAL DISSOLVED SOLIDS (mg/L)	COMMENTS
Less than 1,000	A relatively low level of salinity with no serious burden on any class of livestock.
1,000 - 2,999	Satisfactory for all classes of livestock. The water may cause temporary and mild diarrhoea in livestock not accustomed to it, but should not affect health or performance. Individual mineral levels should be checked.
3,000 - 4,999	Satisfactory for livestock, although it may cause temporary diarrhoea or refusal at first by animals not accustomed to it.
5,000 - 6,999	Reasonably safe for dairy and beef cattle, sheep, swine and horses. Avoid using water with higher levels for pregnant or lactating animals.
7,000 - 10,000	Probably unfit for swine. Considerable risk may exist in using this water for pregnant or lactating cows; horses, sheep and the young of these species or for any animal subjected to heavy heat stress or water loss. In general, use of this water should be avoided, although older ruminants, horses and even swine may subsist on it for long periods under conditions of low stress.
More than 10,000	The risks with these highly saline waters are so great that they cannot be recommended for use under any conditions.
Reprinted from <i>Nutrients and Toxic Substances in Water for Livestock and Poultry</i> , 1974, National Academy of Sciences	

Water may contain a variety of micro-organisms, including bacteria, viruses, protozoa and parasite eggs. A

coliform bacterial count of over 1 per 100 ml can cause scours in calves. A bacterial count of over 20 per 100 ml can result in diarrhoea in cows and cows going off feed.

Water storage and distribution facilities from existing dugouts, wells and natural sources should be operated so as to prevent possible further contamination. When it is required to produce a safe water supply for livestock, an adequate water treatment or processing system will need to be utilised. Water chlorination will remove harmful bacteria and other micro-organisms. Protozoa and enteroviruses are more resistant to chlorination than bacteria.

When water is treated with medications there is a need to ensure that cross-contamination does not occur with animals that are not being treated especially those that are about to go to market. This could occur if medication becomes residual in waterlines that travel over long distances to waterers. If water has a high Total Dissolved Solids content make sure that any medications used in this water are compatible with the high solids content.

Consideration: 71. Establish and follow a water quality and safety program that involves testing of water on a periodic basis. It will include ensuring that both ground and surface water sources are addressed and treated if necessary.

B. FEED HANDLING AND PROCESSING

1. GENERAL COMMENTS

Many livestock producers make extensive use of medications or growth promotants that could in-turn cause residues of livestock food products. Most of the comments in this section will relate to the use of medications in feed rations. These comments will generally not apply to livestock producers who are not using medications in feed rations. The development of their HACCP-based program will greatly facilitated as a result.

There will be concern however when non-medicated livestock are given feeds produced by the same equipment, which is also used to produce feed that is given to other livestock that are medicated. This equipment may become a source of cross-contamination for these animals. Good Production Practises relating to feed handling will include how feed is handed during processing, storage, distribution and feeding so as to prevent contamination by biological or chemical

hazards. An additional area of concern is to insure that the all treated seeds are handled to prevent them from getting into feeds used for livestock.

Consideration: 72. Where and when possible, use feeds without drugs and chemicals that could be found in livestock food products.

Consideration: 73. Follow feed processing, storage, distribution and feeding practises that minimise possible contamination especially when feed equipment is used to handle other livestock feeds or materials.

Consideration: 74. Insure livestock do not have access to treated seed.

2. REGULATIONS

The following regulations will apply primarily to feed manufacturers selling feeds with prohibited materials, but they should be of interest to producers when there are medications used in feeds produced on farm.

Paragraph 171 of the federal Health of Animals Regulations states: (1) Every person who manufactures animal food for ruminants, equines, porcines, chickens, turkeys, ducks, geese, ratites or game birds shall keep records that contain:

- a) the formula for the animal food, including the name and weight of each ingredient used for each lot of the animal food;
- b) a mixing sheet that shows that each lot of the animal food has been produced in accordance with the formula referred to in paragraph (a);
- c) information as to whether or not the animal food contains any prohibited material;
- d) the date of preparation of the animal food;
- e) any information used to identify each lot of animal food; and
- f) the name and address of any person to whom any animal food is distributed or sold and a description of the food, including the name and quantity.

A portion of the federal Feeds Act states the following and it is essentially an exemption for producers:

The Feeds Regulations of the (Feeds Act) does not apply in respect of a feed:

- a) that is manufactured by a livestock producer if it is not offered for sale and has not had incorporated into it any drug or other substance that may adversely affect human health or the environment; or
- b) that is sold by the individual grower thereof, if it is free from prescribed deleterious substances. R.S., c. F-7, s. 4; 1974-75-76, c. 94, s. 2.

While these regulations provide a broad coverage of the legal requirements for feed production, the most important issue for livestock producers is to realise that any medication used in livestock feeds are to be of the approved type and be mentioned in the Medicating Ingredients Brochures. The use of any medication not in accordance with the Medicating Ingredients Brochures is considered as being "extra-label". To legally use any medications in livestock feed rations in a manner or fashion that is not mentioned in the Medicating Ingredients Brochures will require a veterinary prescription.

Consideration: 75. Be aware of and abide by the feed regulations as they apply to your production unit.

Consideration: 76. Obtain prescriptions for the use of any medications in livestock rations that are not in accordance with the use provided for in the Medicating Ingredients Brochures.

3. FEED MANUFACTURERS AND SUPPLIERS

Feed manufacturers have recognised Good Manufacturing Practises to follow during the production of animal feeds and are developing feed safety programs that are based on HACCP. As a producer you have the right and even the obligation to consult with him to ensure that the products he provides are safe to use in your livestock production facility. There are several things that you can discuss with the feed manufacturer.

- a) The supplier has a recognised and acceptable food safety program for feed production, feed ingredients, feed storage and procurement. The food safety program includes the establishment, premises and distribution system of the feed supplier.

- There is a proper clean-out procedure followed between different batches of feed.
- Scales and metering devices are tested for accuracy and scale tickets and feed labels are provided at delivery for every batch of feed.
- Precautions are in place to prevent feed from coming into contact with insecticides, herbicides, fertilisers and industrial chemicals.
- There is an ongoing training program for farm workers of the feed supplier.
- b) The feed supplier performs chemical analyses and other procedures to assure safety and quality when required; ensuring the system is functioning properly.
- There is proper labelling of medicated feeds with instructions for use from the manufacturer. A feed tag is provided for each batch of feed delivered to the farm.
- Feed storage is dry and clean.
- Storage facilities are controlled for medicated vs. non-medicated feeds.
- There is a sample retention program for feeds produced by the company.
- Feed supplier willingly allows customers to visit his facility.

Consideration: 77. Consult with your supplier of feed or feed ingredients about his/her food safety program to determine its suitability to your livestock production.

Consideration: 78. Where feed is purchased from commercial feed companies insure that they are following a HACCP-based program of food safety during production.

4. ON-FARM FEED PRODUCTION

Forages, grains and pastures that provide feed for livestock and are produced on-farm are subject to the same precautions as those feeds that are purchased. Bedding that is used in the livestock production unit should be handled as a feedstuff since most livestock will consume some amount of bedding. Bedding can present the same hazard to livestock as feedstuffs. Physical hazards found in feedstuffs are not usually a

direct threat to food safety but they are a serious health hazard for livestock because of the high potential to cause localised infection (hardware disease in cattle) and resulting poor performance.

Biological hazards, such as Salmonella and coliforms may occur during the production, storage, processing and distribution steps. Manure spreading on cropping areas without an adequate rest period before harvest is an example of how cross-contamination can occur. Chemical hazards such as mycotoxins, industrial and agricultural chemicals could also be present that could, in-turn, contaminate the feed during handling on the farm. It is important to be aware of potential biological and chemical hazards that could be present in the pasture and cropping areas of the livestock operation. Following production practises that include good sanitation is important.

Consideration: 79. Follow a feed and bedding production and handling program that is equivalent to that expected of purchased feeds and which minimises biological and chemical hazards. (

5. ON-FARM FEED PROCESSING

a. *Ingredient and complete feed receiving*

All incoming feed material should be visually checked upon arrival. Forages, bedding and other roughages that are received from off-farm sources will need to be subject to similar precautions as feed ingredients. Transport documents (including packing slips and labels) should be read to ensure that the material ordered has actually been received.

Samples of one to two kilograms should be taken from bulk shipments of feed ingredients and feeds. They should be stored in a clean container that will protect the sample from future contamination. Samples should be stored for a period of time equivalent for the product to enter the food processing and distribution chain. For most purposes this will be approximately one year.

Periodically, samples of incoming complete feeds and ingredients should be forwarded to a recognised laboratory to ensure the ingredient specifications match those ordered and received.

Records should be kept for the reception of each ingredient lot including ingredient name, supplier and shelf life (if appropriate).

All efforts must be made to ensure that ingredients are delivered to the correct location (building, bin or other storage facility on the farm).

Consideration: 80. Develop and implement a plan for receiving feeds and feed ingredients.

Consideration: 81. Examine all incoming feeds and feed ingredients at the time of receiving.

Feeds and feed ingredients, especially supplements and premixes are to be stored in dedicated storage areas. All materials such as herbicides, insecticides, fertilisers, medications and other potential toxins are to be stored in areas separate from feeds to ensure they do not become contaminated.

Consideration: 84. Develop and implement a plan for the storage of feeds and feed ingredients.

THE COMPENDIUM OF MEDICATING INGREDIENT BROCHURES (MIB)

All feed medications approved for use in livestock in Canada are listed in the MIB, along with the approved levels, approved uses, withdrawal period and approved drug combinations. Using a feed medication in other than the approved manner (e.g. increasing the drug level) requires a veterinary prescription since withdrawal periods are not well researched beyond the approved levels. The MIB can be purchased from the federal government in Ottawa, or from your feed mill. The information contained in the MIB for each feed medication is the same as that information contained on the label for that medication.

It should be noted that for some livestock there are no products that are approved for use in the MIB. Legally, any use of a feed medication not mentioned in the MIB will then require a veterinary prescription.

Consideration: 82. Livestock feeders should retain samples of purchased feeds and feed ingredients for periods of up to one year.

Consideration: 83. Document the reception and storage of any incoming medicated feed products.

b. Feed ingredient and incoming feed storage

All storage areas should be cleaned after emptying, and before refilling. This will ensure that old material, which may contaminate the new shipment, does not accumulate or become dated. The storage area should be constructed and managed so that the feed products will remain clean and dry. This will prevent spoilage and the development of moulds, which could in-turn produce mycotoxins.

Just prior to storage of new ingredients on the farm, examine the storage area to be sure it is clean so that the new shipment will not be contaminated with previous material in that storage location. Because most livestock will eat some bedding, it should be handled and stored in the same manner as other forages. Maintain grain and feed storage areas so they can not be contaminated from the droppings of insects, birds, rodents, cats, dogs and other animals.

Consideration: 85. Inspect the storage area before adding incoming ingredients.

Consideration: 86. Clean the feed bins to remove all remaining material and to prevent build-up of old product.

Consideration: 87. Store herbicides, insecticides, fertilisers, medications and other potential toxins in areas separate from feeds.

Consideration: 88. Maintain enclosed feed storage areas and bins as much as possible to prevent contamination from the droppings of insects, birds, rodents, cats, dogs and other animals.

c. Medications and micronutrients

All medications and micronutrients require their own clean, secure storage areas where the products and their descriptive labels will retain their integrity. Inventory records should include the supplier, manufacturer and date of reception and usage. These records are to be maintained by the producer.

Scales and other handling equipment are to be cleaned to avoid cross contamination between different batches of feed. Scales, scoops and other equipment used to handle medications should be thoroughly

cleaned between uses to ensure that contamination from one material to another does not occur. An alternative would be to use dedicated equipment for preparing medicated feeds.

Consideration: 89. Develop and implement a plan to account for medications and micronutrients.

Consideration: 90. Store medications in a dedicated area that is clean, dry and clearly labelled.

Consideration: 91. Keep appropriate inventory records of all medications.

d. Processing and Mixing Feeds

An important first step, whenever mixing feeds for livestock, is to always be aware of the importance of following good sanitation procedures. All sources of potential biological and chemical contamination, as a result of poor practices, need to be controlled. An example would be contamination by using feed contaminated with faeces from other livestock or using dirty equipment to handle feed supplies. Farm chemicals should not be stored in the feed mixing area as they are a source of potential contamination if they are inadvertently added to a livestock feed.

All mixing equipment should be regularly checked for signs of wear that may indicate a future breakdown or a decrease in the mixing efficiency of the equipment. Whether medications are used or not this is a good practice to perform on a regular schedule.

Calibration of volumetric and gravimetric mixers needs to be carried out on a regular basis. Using standard and approved methodology, volumetric and gravimetric mixers must be recalibrated as recommended by the manufacturer of the equipment to ensure correct and accurate proportioning and mixing of feeds.

Mixing equipment efficiency tests should be conducted once per year or more frequently as required to ensure the mixing equipment continues to work at optimal efficiency. This is especially important when medicated feeds are used and the ration contains several ingredients or the ingredients are added in a small amount.

Documentation relating to mixer evaluation and calibration should be kept for a period of one year. This is about equivalent to the period of time required for

most livestock food products to move through the human food chain.

When the feed production equipment produces any medicated feeds for livestock or poultry, a record (Feed Production, Sequencing & Distribution Record or Feed Medication Usage Record) of all feeds produced is to be kept. This is especially important when the livestock are consuming the feeds produced by the equipment and will be processed into food products in the immediate future. It is also important to keep the appropriate records when the equipment is used to produce feeds for other species that may be medicated.

1). Critical Control Point - 2C

Using medicated feeds in livestock rations will generally be identified as a Critical Control Point (CCP-2C) in a HACCP Generic Model for livestock production. CCP-2C refers to possible chemical hazards that may remain in livestock after being fed rations that contained medications. The hazard description, critical limits, monitoring procedures, deviation procedures, verification procedures and HACCP records for this CCP are taken directly from the generic HACCP model for the indicated type of livestock production. This information describes the procedures that are to be followed when livestock are being treated with medications in their rations.

The hazard descriptions for CCP-2C could be as follows:

- Improper processing/mixing of feeds could contain improper levels of chemicals (including medications) and minerals.
- Improper maintenance of processing and measuring equipment could result in chemical feed residues.

The critical limits for CCP-2C are as follows:

- Tolerance limits for medicating ingredients except antibiotics are + or - 20% of the intended or guaranteed dosage level and for antibiotics they are + or - 25% of the intended dosage or guaranteed level in the completed feed. These values are specified under the Feeds Regulations of 1983 for medications listed in the Medicating Ingredients Brochures. These guidelines can be utilised for purposes of CCP-2C.
- Consultation with a veterinarian and following his instructions for dosage levels and withdrawal periods when medications are used is required to be

legal and will help insure chemical residues are not present.

- Proper prescriptions are available when they are required. Prescriptions are required for all medications used in feed production that is not in accordance with the Medicating Ingredients Brochures.

The monitoring procedures for CCP-2 are as follows:

- There is a program for purchasing and monitoring of incoming medicated feeds.
- A feed medication plan is maintained.
- Feed production, sequencing and distribution records are maintained.
- Good Manufacturing Practises for feed processing equipment (including calibration and sanitation) are followed.
- Accepted sanitation, mixing and processing protocols are thoroughly followed.
- Visual observations are conducted to ensure the feed processing system is operating as planned.

The deviation procedures (when there is a problem) for CCP-2C could be as follows:

- Notify management.
- Seek professional advice.
- Record deviation.
- Isolate, contain and assess potential damage.
- Identify and implement corrective action.
- Initiate recall procedure if applicable.
- Reassess marketing strategy if required.
- Review previous deviations.

The verification procedures for CCP-2C are as follows:

- Perform record review monthly.
- Review inventory vs. usage monthly.

- Follow a feed testing procedure to verify potential residues are not present in rations being fed to animals going to slaughter. Note: Testing may be required even if no medicated feeds are used on the farm or the use of medicated feeds was at a time that was sufficiently distant from marketing. This will help to insure and verify that no residues will be present in livestock or livestock products being marketed.

- Review written procedures

The suggested HACCP records required for CCP-2C are as follows:

- Treatment Plan for Medicated Feed.
- Feed Medication Inventory & Record of Purchase Record.
- Feed Production, Sequencing & Distribution Record or Feed Medication Usage Record.
- Equipment Maintenance Record.
- Deviation Record.

Consideration: 92. Develop, implement and follow a procedure that will insure that the CCP-2C is adequately controlled in the production facility.

Consideration: 93. Maintain the required HACCP records to demonstrate that CCP-2C is under control at all times during production.

Consideration: 94. Develop a plan (Treatment Plan for Medicated Feed) for all feeds produced on the farm using the same equipment. When feeds are produced for other livestock, this should be noted.

e. Equipment clean out between feed batches

Good Manufacturing Practises for feed production include sanitation. Cleaning of processing and mixing equipment is recommended to avoid residue build-up and maintain efficiency of equipment. To ensure that build-up does not occur in the mixer, and mixer efficiency remains optimal, mixing equipment should be cleaned between batches. This is especially important when switching from medicated to non-medicated feed production, or when ingredients are used which can adhere to the mixer parts. The importance of sanitation was noted in the description for the CCP-2C. Good sanitation is essential to make CCP-2C work effectively.

To ensure that cross contamination does not occur when mixing different batches of feed, the equipment may be cleaned by one of three ways depending in the situation. This will remove any material that might be considered as a contaminant in the next batch. The following cleaning methods are acceptable.

- Physical cleaning: this involves the use of brushes, brooms, vacuum or air pressure equipment.
- Flushing: this involves using a designated material in the mixer to pick up any remnants of the last batch of feed.
- Sequential production: the feed mixer is utilised so that the sequence of feed batch preparations will not result in any contaminated feeds being fed to animals that are about to produce a food product for processing.

When medicated feeds are used on a regular basis, a separate feed handling system should be used for this feed to reduce the possibility of medications getting into critical animals that are producing food products for processing.

Consideration: 95. Ensure clean-out and sanitary procedures are followed for all feed handling equipment.

Consideration: 96. Clean feed processing equipment thoroughly and on a regular basis especially when it is used to process feeds containing medications or ingredients that may remain in the equipment.

Consideration: 97. Ensure proper sequencing and flushing procedures are followed for equipment to prevent cross contamination between batches of feed when medicated feed is used.

f. Finished product storage for farm produced and commercial feeds

In most cases, finished or processed feeds are fed immediately with little or no storage before being fed. Finished feed batches must be stored in clean, dry receptacles to avoid introduction of contaminants or other materials that may degrade the feed. The storage area must be kept dry to prevent the growth of moulds, which could produce mycotoxins. This will be important when feed is stored in outdoor bins or feeders. The covers should be able to prevent water from contaminating the finished feed. The finished feed

requires a storage area free from pests such as insects or vermin that may be carriers of disease. All feeds must be stored separately from fertilisers, herbicides, insecticides and other potential contaminants.

Samples of finished feeds should be taken for future reference especially if the feed equipment handles medicated feeds. The producer should retain samples of mixed feeds, in a clean container, for a period equivalent to the passage of the livestock or livestock food product through the marketing system. This will allow for trace-back if problems should occur. Feed samples must be stored such that they will not come into contact with any agricultural chemicals, including vapours.

Consideration: 98. Store finished feeds in a clean and dry area or container.

Consideration: 99. Retain samples of finished feeds for future reference.

g. Feed product distribution

All medicated feeds must be distributed to the correct location in the livestock production facility. The livestock producer or manager must always ensure that the feed is transported to the correct destination when a commercial supplier delivers it. This is especially important when chemical cross-contamination could occur.

While it is not likely to be a factor of high risk, it is important to handle feeds with care during distribution and feeding. This will minimise possible sources of cross-contamination by Salmonella, E. coli. and other bacteria from contaminated storage areas and equipment.

On farms with multiple species of animals or poultry and sophisticated feed production systems, every effort must be taken to insure that cross-contamination of feed does not occur.

- The distribution system must be clearly labelled. The distribution plan for feed on the farm must be clearly specified to ensure the right feed goes to the right destination, for example, colour coded pipes, ducts, bins and etc.
- Failsafe mechanisms should be used as indicated and when available to prevent feed from getting to wrong locations. The producer should develop a system to ensure correct delivery of the feed to the correct location on the farm.

- Transport feed to correct location. The producer should ensure that the feed is transported to the correct destination when a commercial supplier delivers it or it transported by pneumatic tubes.

When a feed delivery vehicle distributes medicated feed, extra precautions and accurate recording of the feed distribution will be required. A good clean out or adequate flushing of the equipment is required.

This step can be identified as a Critical Control Point. Consequently, monitoring, verification and record keeping procedures will be required when there are medicated feeds being distributed by the equipment.

1). Critical Control Point - 3C

The distribution of medicated feeds could be identified as a Critical Control Point (CCP-3C) in the HACCP Generic Model for a livestock production enterprise. This Critical Control Point refers to possible chemical hazards that may be in livestock after being fed rations that contain medications as a result of improper feedstuff distribution procedures. This hazard could occur when the equipment that is used to distribute feed to livestock handles any medicated feeds. The hazard description, critical limits, monitoring procedures, deviation procedures, verification procedures and HACCP records for this CCP will be taken directly from the HACCP Generic Model for the livestock in question. This information describes the procedures that are to be followed when livestock are fed using equipment that has handled medicated feeds.

The hazard description for CCP-3C could be:

- Improper distribution and cross-contamination between batches of feedstuffs and handling equipment could result in chemical feed residues.

The critical limits for CCP-3C could be as follows:

- There is zero tolerance for medicated feeds to be delivered to the wrong destination. All medicated feeds must be distributed to the intended site for the intended animals.
- There is a zero tolerance for chemical residues in excess of the Minimal Residues Limits in livestock food products according to Federal Acts and Regulations for the chemical or medication in question as a result of improper distribution.
- There is consultation with a veterinarian and instructions are followed when medicated feeds are

used or when there are any questions relating to the use of medicated feeds.

The monitoring procedures for CCP-3C could be as follows:

- A Feed Medication Plan is maintained and followed.
- A Feed Production, Sequencing and Distribution Record is maintained.
- There are observations that Good Production Practices for feed distribution equipment are being followed.
- There are visual observations to ensure system is operating as planned and that accepted sanitation, and distribution protocols are being followed.

The deviation procedures (when there is a problem) for CCP-3C could be as follows:

- Notify management.
- Seek professional advice.
- Record deviation.
- Isolate, contain and assess potential damage.
- Identify and implement corrective action.
- Initiate recall procedure if applicable.
- Reassess marketing strategy if required.
- Review previous deviations.

The verification procedures for CCP-3C could be as follows:

- Record review
- Review inventory vs. usage
- Follow a feed testing procedure to verify potential residues are not present.
- Review written procedures with staff to ensure they understand the procedures that are in place.

The suggested HACCP records required for CCP-3C could be as follows:

- Treatment Plan for Medicated Feed.
- Feed Medication Inventory & Record of Purchase.

- Feed Production, Sequencing & Distribution Record or Feed Medication Usage Record.
- Deviation Record.

Consideration: 100. Develop, implement and follow a procedure that will insure that the CCP-3C is adequately controlled in the production facility.

Consideration: 101. Maintain the required HACCP records to demonstrate that CCP-3C is under control at all times during production.

Consideration: 102. Develop and implement procedures to prevent biological and chemical cross-contamination between batches of feeds during distribution especially when medicated feeds are being used.

6. RESIDUE TESTING FOR DRUGS AND CHEMICALS IN FEEDS

As previously noted, when animals are treated with medications, a verification procedure is required in a HACCP system. Verification usually involves some testing of the outgoing or finished product to confirm that it is free of any biological, chemical or physical residues used during production. In the case of feed processing this will require verification of the finished feed product and may include testing of incoming ingredients.

Animals and livestock products can and will be tested for drug residues at processing to verify that drug or chemical residues are not present. Tests are also performed when there is reason to suspect a drug or chemical residue.

Depending on the time of use and the type of drug used in feeds, this procedure may not be necessary. This could apply when livestock are kept in finishing areas for long periods (60 days or more) of time without any treatments being given. If feed processing equipment is used for producing feeds for other species of animals receiving medicated feeds appropriate steps including testing should be taken to insure that there is no cross-contamination between batches of feed.

The usual testing procedure will be to collect samples of completed feeds fed to livestock particularly when some of the feeds produced may contain a medication. This is especially important when the same equipment is used for the preparation of medicated and non-medicated feeds. This would also apply when the

equipment is used to prepare feeds for other classes of livestock receiving medicated feeds.

It is a good procedure to collect and store feed samples for future reference in case testing is required. Store samples for at least six months after collection in a cool, dry place. As a general guide, this period of storage should be equivalent to the period of time required for the meat or livestock product to be consumed.

Consideration: 103. Collect, label and store feed samples for possible future testing when feed is delivered to, produced and distributed on the farm.