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OVERVIEW



OVERVIEW

Northwest Sustainable Dairies (NSD) is a Northwest dairy farm program that covers five main topic areas:

- Animal Care and Welfare
- Environmental Stewardship
- Milk Quality and Safety
- Labor Management
- Energy

Each main topic is developed into chapters. A *guiding principle* leads off with a general theme for each chapter. On-farm *expectations* explain the fundamental responsibilities and obligations being achieved on Northwest dairy farms. The expectations are accompanied with *background* information and, when necessary, *guidelines* have been included. *Verification* steps are presented for each expectation, which can be used to check conformance to the expectations.

Northwest Sustainable Dairies is a resource for all individuals who want to know more about the Oregon and Washington dairy industry. Northwest Sustainable Dairies can also be found online at www.northwestsustainabledairies.org.

DEFINITIONS:

Below is a brief description of each heading found within a chapter.

Guiding Principle:

The guiding principle is the over-arching theme for that specific chapter.

Expectation:

The expectation is the practice that is to be achieved on the farm. Expectations that “must” be achieved are (1) those in which the dairy farmer is legally obligated to abide by or (2) professional obligations to be met by the dairy farmer strongly recommended by the committee.

If an expectation “should” be achieved, it is an expectation that has been highly advised by the committee.



Background:

The background is used to provide information and support for the expectation.

Verification:

Verification provides a list of the items/elements that can be used to determine if the expectation has been achieved.

Guideline:

The guideline provides scientific recommendations and/or helpful resources to assist the dairy farmer in achieving the expectation.



SUMMARY



ANIMAL CARE AND WELFARE

Dairy farmers care about their animals and work every day to provide the best possible care for them. Because of this, the Northwest dairy industry has outlined its expectations for animal care and welfare, including:

HOUSING

- A clean, safe, and comfortable environment to promote health and well-being of dairy cattle.

*For more information about **Housing**, please refer to Page 15.*

NUTRITION

- Regular access to a wholesome, balanced diet formulated to meet each animal's nutritional needs for a healthy life.

*For more information about **Nutrition**, please refer to Page 17.*

ANIMAL HEALTH

- Use of preventive care and quick, appropriate management to promote and maintain animal health, including treatment of ill or injured animals.

*For more information about **Animal Health**, please refer to Page 20.*

HANDLING, MOVEMENT AND TRANSPORT

- Proper animal handling, movement, and transport to maintain a safe environment for all animals and animal handlers.

*For more information about **Handling, Movement, and Transport**, please refer to Page 25.*

WORKER EDUCATION

- Adequate training and regular supervision of all individuals responsible for the caring of animals.

*For more information about **Worker Education**, please refer to Page 28.*



ENVIRONMENTAL STEWARDSHIP

Clean water is important for basic facets of life such as drinking water, animal habitat, and recreation. Dairy farms are included. Dairy farm families, employees, and animals all rely on clean water. Because they depend on the same clean water as their communities, the Northwest dairy industry has outlined its expectations for water quality protection, including:

MANURE MANAGEMENT FACILITIES

- Investment in facilities specifically designed to collect and store manure and process waste water.
- Proper management of animal housing and manure storage facilities to protect water quality and promote animal health and well-being.

*For more information about **Manure Management Facilities**, please refer to Page 35.*

MANURE HANDLING

- Proper application rates of manure, along with appropriate timing and placement, to ensure water quality protection.

*For more information about **Manure Handling**, please refer to Page 37.*

RECORD KEEPING AND DOCUMENTATION

- Documenting manure management to benefit water quality protection and crop production.
- Records of on-farm practices and a history of manure management activities.

*For more information about **Record Keeping and Documentation**, please refer to Page 40.*



MILK QUALITY AND SAFETY

Consumers want to know more about their food: where it comes from and how it was made. Producing safe, wholesome milk is of great importance to Northwest dairy farmers. The Northwest dairy industry has outlined its expectations for producing high quality, safe milk, including:

FACILITIES

- Well designed, constructed, and maintained milking facilities for production of safe, high quality milk.
- Animal housing designed and maintained to maximize animal comfort and ensure milk comes from clean, healthy cows.

*For more information about **Facilities**, please refer to Page 48.*

SANITARY MILK COLLECTION

- The critical importance of cleanliness in the milking facility and with all equipment used in the production and storage of milk.
- Management of cow and personnel hygiene during milking times.

*For more information about **Sanitary Milk Collection**, please refer to Page 50.*

MILK SAFETY

- Specific procedures to cool and store milk properly.
- Multiple safety checks and procedures to ensure that only safe milk enters the food supply.
- Testing for milk safety and quality at all stages of production and processing until it arrives at the store.

*For more information about **Milk Safety**, please refer to Page 52.*



LABOR MANAGEMENT

With many routine jobs needing done on a dairy farm every day, it is usually essential to have hired workers. The Northwest dairy industry recognizes the importance of handling and treating employees appropriately and has outlined its expectations for labor standards, including:

FARM LABOR REGULATIONS

- Relevant state and federal regulations for employees.

*For more information about **Farm Labor Regulations**, please refer to Page 58.*

COMMUNICATION

- The importance of clear and documented communications with all employees, including the development of standard operating procedures.
- Training and supervision to encourage safety of employees and animals.

*For more information about **Communication**, please refer to Page 59.*

SAFETY

- Development of clear Emergency Response Plans and provision of a safe workplace, with any unsafe conditions corrected immediately.

*For more information about **Safety**, please refer to Page 61.*

COMPENSATION

- Fair and equitable compensation for performance of employees.

*For more information about **Compensation**, please refer to Page 62.*



ENERGY

Household energy use is just like energy use on a dairy farm. Northwest dairy farmers employ many of the same energy saving practices to conserve energy and use it more efficiently. Dairy farmers can also invest in alternative energy sources. The Northwest dairy industry has outlined its expectations for on-farm energy management, including:

ENERGY ANALYSIS

- Energy self-assessments or on-farm energy audits to evaluate energy use and outline potential areas of improvement.

*For more information about **Energy Analysis**, please refer to Page 67.*

ENERGY CONSERVATION & EFFICIENCY

- Establishing energy conservation practices, often by changing current behavior and habits.
- Promoting efficient energy use with the installation of more energy efficient equipment

*For more information about **Energy Conservation & Efficiency**, please refer to Page 68.*

RENEWABLE ENERGY

- Encouraging renewable energy options such as solar power and anaerobic digesters.

*For more information about **Renewable Energy**, please refer to Page 69.*



ANIMAL CARE AND WELFARE



INTRODUCTION

There are growing concerns about the welfare of agricultural animals. As legislation aimed at regulating farm animal welfare is increasingly proposed and passed it has become imperative for members of the animal industries to self-regulate, keeping in mind scientific findings as well as social concerns of stakeholders. A growing number of questions are being raised about standard industry practices and their impacts on farm animal well-being.

In recognition of these concerns, the leadership of the Northwest dairy industry has worked in partnership with stakeholders and participating farmers to outline professional expectations for participants detailing our obligation to the animals in our care.

Proper animal care is essential and necessary to ensure healthy dairy animals. Through appropriate *housing, nutrition, animal health, handling, movement, and transport* as well as *worker education*, animal care and welfare can be optimized for dairy cattle.

This document outlines these expectations and responsibilities in greater detail.

The format and content of this Animal Care and Welfare section was adapted from the National Dairy Animal Well-Being Initiative.



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HOUSING

Guiding Principle: Facilities should be designed, constructed, and maintained to provide and promote health, comfort, and safety of all animals.

Expectation for Newborn Calves: Calves should be born in a clean environment. The calving area should be separate from the rest the herd.

Background: Calving in a clean environment benefits both calf and cow health. Providing a clean calving environment minimizes the exposure of the calf to harmful bacteria and other risks. For the cow, a clean environment helps her to recover after calving. Having the calving area separate from the rest of the herd allows for closer observation, provision of assistance, if necessary, and avoidance of injury to the animals and caretakers.

Verification: Visual inspection of calving area (pens and/or pasture). Determine frequency of calf mortalities.

A clean, safe, and comfortable environment is important for the health and the well-being of dairy cattle.

Housing should be maintained to ensure a healthy, supportive environment is available for all animals.

Expectation for Heifers: Heifers should be provided with a clean, comfortable, and safe environment. Heifers should also be provided with shelter that is appropriate for weather and climatic conditions. If housed individually, heifers must have sufficient area to lie down and allow for normal resting behavior. In circumstances where heifers are group housed, sufficient space should be allocated to ensure that, at all times, each animal can lie comfortably without competing for space. Whenever possible, heifers should have the freedom to move around and express normal behavior. To minimize the incidence of injury, flooring should be designed and maintained to avoid excessive slips and falls. All animal housing should have adequate ventilation for animal and worker health.

Background: Providing clean, comfortable, and safe shelter with good air quality minimizes animal distress and promotes good health. Inadequate air ventilation can lead to health problems and should be avoided.

Note: Information on ventilation in dairy housing facilities can be obtained from your local extension office, or refer to articles in the NRAES-77 publication (see references).

Verification: Visual assessment of animals and facility. Hygiene scoring of animals.



Expectation for Cows: Cows should be provided with a clean, comfortable, and safe environment. Cows should also be provided with shelter that is appropriate for weather and climatic conditions. If housed individually, cows must have sufficient area to lie down and allow for normal resting behavior. In circumstances where cows are group housed, sufficient space should be allocated to ensure that, at all times, each animal can lie comfortably without competing for space or lying on and/or against one another. Whenever possible, cows should have the freedom to move around and express normal behavior. To minimize the incidence of injury, flooring should be designed and maintained to avoid excessive slips and falls. All animal housing should have adequate ventilation for animal and worker health.

Background: Housing dairy cows in a clean environment promotes proper animal hygiene, which can positively affect udder health. Providing appropriate shelter at all times further ensures animal comfort and health. Maintaining good air quality promotes animal comfort and helps prevent disease.

Verification: Visual assessment of animals and facility. Locomotion evaluation. Hygiene scoring of animals.

Expectation for Bulls: Bulls should be provided with a clean, comfortable, and safe environment. Bulls should also be provided with shelter that is appropriate for weather and climatic conditions. If housed individually, bulls must have sufficient area to lie down and allow for normal resting behavior. In circumstances where bulls are group housed, sufficient space should be allocated to ensure that, at all times, each animal can lie comfortably without competing for space or lying on and/or against one another. Whenever possible, bulls should have the freedom to move around and express normal behavior. To minimize the incidence of injury, flooring should be designed to avoid excessive slips and falls. All animal housing should have adequate ventilation to ensure proper air quality is maintained for animal and worker health.

Background: Bulls should be housed in a clean, comfortable, and safe environment to promote animal health and well-being. Maintaining good air quality promotes animal comfort and helps prevent disease.

Verification: Visual assessment of animals and facility. Locomotion evaluation. Hygiene scoring of animals.



NUTRITION

Guiding Principle: All animals should have access to a nutritionally adequate diet and clean, fresh water daily.

Expectation for Newborn Calves: Every newborn calf must receive adequate quantities of high quality colostrum as soon as possible after birth. The colostrum should be fed in a way that promotes health and minimizes the risk of disease. This applies to bull calves as well as heifer calves.

Background: Dairy calves are born without natural immunity. Initial immunity of the calf is acquired by consuming colostrum. Colostrum, the first milk produced after calving, contains immunoglobulins which provide the calf with immune protection. Colostrum is a better source of immunoglobulins, protein, fat, minerals and vitamins than the milk produced during any other stage of lactation. The concentration of these immunoglobulins and nutrients decreases with subsequent milkings. The calf has the ability to absorb the immunoglobulins directly from the digestive tract into the blood, but this ability decreases rapidly within the first 24 hours after birth.

Proper nutrition is essential for promoting and maintaining animal health and well-being.

Dairy cattle must have access to a wholesome, balanced diet that is formulated to meet the animal's nutritional needs to ensure a healthy life.

Guideline: According to the "Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching" all calves should consume colostrum in the amounts of 8 to 10% of body weight (2 to 3 quarts) within 4 to 5 hours after birth. This same amount of colostrum should also be fed to the calf a second time within 24 hours of birth.

Verification: Review written farm protocol and any verifiable records. Talk with manager and employee(s) responsible for calf care separately. If frozen colostrum or colostrum replacement is used, look for those items. Identify appropriate source of colostrum. Determine frequency of calf illness or mortality.

Expectation for Heifers: Heifers must have access to a wholesome, balanced diet and clean water. Feed should be fed in a manner that promotes health and minimizes risk of disease. Adequate bunk space should be provided so all animals can access feed without undue competition.



Background: A balanced diet is necessary for heifers to reach full genetic potential at maturity. For this to occur, the diet should meet the National Research Council's Nutrient Requirements of Dairy Cattle (2001) published recommendations for heifers. Dietary adjustments may be necessary to accommodate the changing nutritional requirements of heifers.

Verification: Visual inspection of heifer feeders, feed on hand, and condition of waterers. Talk with manager and employee(s) responsible for heifer care separately. Evaluate body condition scores. Determine if there is a relationship with a nutritionist and if nutrient analysis is available for feed ingredients.

Note: Body condition scoring is a common dairy practice used to determine the nutritional status of an individual heifer or cow, or to evaluate the average condition for a group. Animals are evaluated on a 5-point scale, with a score of 1 for extremely thin animals and a score of 5 for extremely fat animals. Ideal body condition scores vary, depending on the stage of development or lactation (Wildman et al., 1982). Breed specific height and weight goals for dairy heifers can be found in "Monitoring Dairy Heifer Growth" by Jud Heinrichs and Brian Lammers.

Note: Information about adequate bunk space and other feeding behavioral issues is found in "Understanding Cow Behavior from a Nutritional Perspective", which can be found online at: tristatedairy.osu.edu/Proceedings%202008/DeVries%20paper.pdf.

Expectation for Cows: Cows must have access to a wholesome, balanced diet and clean water. Feed should be fed in a manner that promotes health and minimizes risk of disease. Adequate bunk space should be provided so all animals can access feed without undue competition.

Background: Adult cows need adequate feed and water to meet genetic potential and maintain a productive, healthy life. Diets should meet the needs of cows as outlined by the National Research Council's Nutrient Requirements of Dairy Cattle (2001) published recommendations. Dietary adjustments may be necessary to accommodate the changing nutritional requirements of cows. For example, the nutrient requirements for a dry cow are different than those for a lactating cow.

Verification: Visual inspection of feeders, feed on hand, and condition of waterers. Talk with manager and employee(s) responsible for cow care separately. Evaluate body condition scores. Determine if there is a relationship with a nutritionist and if nutrient analysis is available for feed ingredients.

Guideline: According to Temple Grandin (2007), at least 90% of the cows on a dairy farm must have a body condition score of more than 2. Fewer than 3% should have a score of less than 2.



Expectation for Bulls: Dairy bulls must have access to a wholesome diet and clean water. Feed should be fed in a manner that promotes health and minimizes risk of disease. Adequate bunk space should be provided so all animals can access feed without undue competition.

Background: Dairy bulls need adequate feed and water to reach full genetic potential at maturity and maintain a productive, healthy life. Diets should meet the needs of bulls as outlined by the National Research Council's Nutrient Requirements of Dairy Cattle (2001) published recommendations. Dietary adjustments may be necessary to accommodate a bull's nutritional requirements.

Verification: Visual inspection of bull feeders, feed on hand, and condition of waterers. Talk with manager and employee(s) responsible for bull care separately. Evaluate body condition scores. Determine if there is a relationship with a nutritionist and if nutrient analysis is available for feed ingredients.



ANIMAL HEALTH

Guiding Principle: The health of all animals should be maintained through preventive care programs, supported by rapid diagnosis and proper treatment when necessary.

A. VETERINARY - CLIENT RELATIONSHIP

Expectation: All dairy farms should have a valid relationship with a veterinarian.

Background: A veterinary-client relationship is the interaction between the client, the animals, and the veterinarian. This interaction should occur on a regular basis and should encompass various aspects of herd health management for the relationship to be considered valid.

Guideline: According to the American Veterinary Medical Association (2008), a valid veterinary-client relationship exists when all of the following conditions have been met:

1) *The veterinarian has assumed responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions.*

2) *The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s), or by medically appropriate and timely visits to the premises where the animal(s) are kept.*

3) *The veterinarian is readily available, or has arranged for emergency coverage, for follow-up evaluation in the event of adverse reactions or the failure of the treatment regimen.*

Animal health is an indicator of appropriate animal husbandry, as well as food safety practices.

Preventive care and proper management should be used to promote and maintain animal health. Rapid diagnosis and treatment should be administered immediately to all ill and/or injured animals.

Verification: Review medication prescriptions and receipts from a veterinarian.



B. HERD HEALTH PLAN

Expectation: All dairy farms should have a written, current herd health plan which addresses all important aspects of herd health. The herd health plan should be developed, documented and regularly updated with a veterinarian. At minimum, the herd health plan should include the following elements:

- I. Newborn Calf Health and Care
- II. Disease Prevention and Management, including routine vaccinations
- III. Hoof Health
- IV. Udder Health
- V. Non-ambulatory Animal Handling
- VI. Biosecurity
- VII. Animal Mortality Management, including proper euthanasia procedures
- VIII. Emergency Contact Information

Background: The health of the animals on a dairy farm is an essential part of proper animal husbandry. Prevention, rapid diagnosis, and treatment of injury or disease provide the foundations for good animal well-being. The development of a herd health plan assists with the prevention of common diseases and establishes treatment protocols when medical attention is necessary.

Verification: Review herd health plan and observe date of last revision.

C. MEDICATION USE

Expectation: All medications administered for treatment of animals should be used in a responsible manner.

Background: Medications are used for reducing animal pain and discomfort, as well as curing ailments. Proper treatment of ill animals includes prompt diagnosis and a plan which may require the use of medications. However, medications should only be used when they are absolutely necessary and should be administered with the appropriate dose and route of administration. Prudent use of antibiotics minimizes the risk of developing antibiotic resistance, minimizes other adverse environmental impacts, and reduces the opportunity for antibiotic residues to appear in food products. Any medications given to an animal must be administered in accordance with a veterinarian's recommendations.

Verification: Review medication prescriptions, herd health plan, and records documenting treatments.



D. MANAGEMENT PROTOCOLS FOR PAINFUL PROCEDURES AND CONDITIONS

Expectation: All dairy farms should have management protocols for painful procedures and conditions. Animal distress and disruption of normal behavior should be managed and minimized.

Background: Certain elective procedures performed to facilitate management of dairy animals may cause short term distress, discomfort, and/or pain.

I. TAIL DOCKING

Expectation: Tail docking is discouraged. If a dairy farm chooses to dock tails, then tails should be docked at a time and in a manner that will cause animals the least amount of pain, distress, and disruption of normal behavior. Veterinary counsel is advised.

Background: Tail docking is not a common practice on Northwest dairy farms. However, most dairy farms that milk cows with docked tails report improved employee and cow cleanliness.

Note: In terms of udder health, udder cleanliness, or cow cleanliness, most studies have shown no difference between cows with intact tails and those with docked tails (Tucker et al., 2001; Schreiner and Ruegg, 2002). One study showed that the rear quarters of the udder were cleaner for cows with docked tails when compared with intact cows; however, udder cleanliness scores and udder health measures were not different (Eicher et al., 2001). While studies have shown mild to moderate behavior changes and acute pain as a result of the tail docking procedure (Eicher and Dailey, 2002; Eicher et al., 2006) and increased fly load with docked tails (Eicher et al., 2001, Eicher and Dailey, 2002; Tom et al., 2002), there is inconclusive evidence whether or not animals experience chronic pain from tail docking (Tom et al., 2002) and some studies found little to no behavioral or physiological differences (Eicher et al., 2000; Eicher et al., 2001; Schreiner and Ruegg, 2002). Switch trimming or clipping, rather than tail docking, can be practical for animal cleanliness, improved employee comfort and health, excellent udder hygiene and milk quality (Tucker and Weary, 2001), and is recommended as an alternative to docking tails.

The American Veterinary Medical Association opposes routine tail docking of cattle and states that, when medically necessary, tail docking must be performed by a licensed veterinarian. Docking in an appropriate location on the tail is recommended to ease the docking process and to avoid leaving a tail that is too short for proper restraint or normal protection of the urogenital tract (Stull et al., 2002).

Verification: Visual determination if tails are docked. If tails are docked, assess the resulting tail length and at what age the procedure occurs. Review tail docking protocol.



II. DEHORNING

Expectation: Calves should be dehorned at the earliest age possible. Dehorning should be performed in a manner that causes the animal the least amount of pain, distress, and disruption of normal behavior. If calves are older than three months, a local anesthetic should be administered prior to dehorning. The dehorned area should be protected and treated when appropriate. Veterinary advice may be necessary.

Background: Dehorning is performed to reduce the risk of cattle injuring herdmates and personnel, reduce feeder space requirements, and increase handling ease. Calves should be dehorned at the earliest age practicable to ease restraint and handling, reduce the risk of major blood loss, and minimize the chance of infection and/or fly larvae infestation. Ideally, dehorning should be performed on calves before three months of age (Agriculture Canada, 1990; La Fontaine and de Witte, 2002). If calves are older than three months, a local anesthetic should be administered prior to dehorning to minimize pain and discomfort.

Verification: Visual assessment of calves. If dehorning occurs after three months of age, review receipts for the procedure. Talk with manager and employee(s) responsible for dehorning separately.

III. CASTRATION

Expectation: Castration of bulls should be performed at the earliest age practicable to minimize pain, distress, and disruption of normal behavior. If the bull to be castrated is older than four months of age, then the operation should be performed with veterinarian assistance and using a local anesthetic. Follow-up care should be provided if necessary.

Background: Bull calves are castrated to reduce the chance of unplanned mating, as well as to reduce aggression toward other animals and animal caretakers. Bull calves should be castrated at the earliest age practical. If bulls are older than four months of age, then a local anesthetic should be used for the procedure to minimize pain and discomfort.

Verification: Visual assessment of bull calves and steers. If castration occurs after four months of age, review receipts for the procedure. Talk with manager and employee(s) responsible for castration separately.



E. SPECIAL NEEDS ANIMALS

Expectation: All dairy farms should have protocols for humane handling of special needs animals, which includes sick, lame, and downer cows.

Background: On occasion, dairy farms may have special needs animals that must receive special handling and treatment. It is critical that these animals are protected from other animals, are provided appropriate shelter, and have easy access to food and water. While special needs animals receive treatment, it is also important to manage pain and minimize animal discomfort. Euthanasia may be appropriate for chronically ill animals or injured animals experiencing severe pain or distress that cannot be relieved.

Verification: Review written protocol for handling special needs animals. Talk to those involved in the handling of special needs animals. Visual assessment of sick pens. Review treatment records.

F. EUTHANASIA

Expectation: All dairy farms should have a written protocol for the timely and humane euthanasia of dairy cattle. Any individual responsible for euthanasia must be trained and competent in the methods selected for use.

Background: Euthanasia may be necessary for animals with a terminal prognosis that are unfit for harvest or transport. Euthanasia should be performed in a manner consistent with the standards set by the American Association of Bovine Practitioners.

Guideline: The following methods of euthanasia are acceptable:

- *Gunshot
- *Penetrating captive bolt
- *Barbiturate overdose
- *Electrocution
- *Exsanguination preceded by any of the above.

Euthanasia by blunt force trauma, such as a hammer blow, exsanguination without stunning, injection of air or chemicals that would cause a painful death, or electrocution with wall current are not acceptable methods.

More information about Euthanasia can be found in "Practical Euthanasia of Cattle: Considerations for the Producer, Livestock Market Operator, Livestock Transporter, and Veterinarian" prepared by the Animal Welfare Committee of the American Association of Bovine Practitioners. Available online at: aabp.org/resources/euth.pdf.

Verification: Review written protocol for euthanasia. Talk with individual(s) responsible for performing euthanasia. Review treatment and euthanasia records.



HANDLING, MOVEMENT, AND TRANSPORT

Guiding Principle: Handling, movement, and transport of animals should be done in a humane, appropriate and safe manner.

Expectation: All dairy farms must take care to handle animals in a calm, gentle, and appropriate manner.

Background: Animals must be handled calmly and appropriately at all times to avoid unnecessary pain or distress. Proper training and retraining of employees is essential for maintaining a farm that handles animals appropriately. Individuals handling the animals must be trained in animal handling, and the consequences of inhumane handling should be known and enforced. Handlers should be assessed and retrained as needed, on a regular basis. The use of electric prods is prohibited except as a last resort when animal and human safety is in jeopardy.

Proper animal handling, movement, and transport are important for maintaining animal health.

Dairy cattle should be handled in a manner that promotes safety and well-being for both the animal and the animal handler.

Guideline: Animals should be moved in a manner that results in fewer than 1% of animals falling as they go to or from the milking parlor (Grandin, 2007).

Verification: Review protocol for handling animals. Visual assessment of caretakers moving animals. Review documentation of training completed by employees for handling animals and parlor behavior.

Expectation: Animals that are unable to stand and/or walk unassisted should receive extra care when being handled or moved to avoid unnecessary pain or distress to the animal.

Background: Although generally not common on farms, animals can become non-ambulatory for a variety of reasons ranging from acute injury (a broken leg or nerve damage from calving) to attenuating illness or severe lameness. When an animal becomes non-ambulatory, the potential for recovery must be assessed. Animals that are likely to recover should be moved to an area with adequate bedding, access to feed and water, and no risk of trampling by other animals. They should also have appropriate shelter from direct sunlight or inclement weather. Non-ambulatory animals that cannot be carried should be moved with an appropriate sled or sling. Animals should not be pulled, dragged, pushed, or otherwise moved using force applied directly to the animal. A prognosis should be considered before the decision is made to move the animal. Farms should have a plan for dealing with non-ambulatory animals in the herd health plan.



Guideline: Methods for moving downer animals include:

**Use of a wide conveyer belt is one way to move downer animals. A three-foot-wide conveyer belt can often be obtained from mines inexpensively. The animal can be rolled onto the belt, and the belt can then be moved with a tractor.*

**Harnesses are available for lifting downer animals. The use of a harness requires ceiling space for a forklift or a lifting loader.*

**If a larger loader is available, an animal can be rolled into the bucket, although this method is not preferable in most circumstances.*

**Double-deck semi-trailers that regularly haul old dairy cows should have a side door in the belly compartment so downer animals can be rolled out the door instead of being dragged up the rear ramp. If an animal goes down in the belly compartment of a semi-trailer without side doors, humane removal is impossible; euthanasia is strongly recommended.*

More information about handling downer animals can be found in "Handling of Crippled and Nonambulatory Livestock" published Fall 1998 in the Animal Welfare Information Center Bulletin, Vol. 9, no.1-2 by Temple Grandin, Ph.D. Available online at: nal.usda.gov/awic/newsletters/v9n1/9n1grand.htm.

Verification: View the equipment used for moving non-ambulatory animals. Talk with manager and employee(s) responsible for this duty separately. Observe on-site handling practices. Review documentation of training. Review herd health plan.

Expectation: Handling and loading facilities must be safe for all animals. Caretakers should handle animals in a humane and safe manner at all times, taking care to avoid unnecessary pain or distress.

Background: Handling facilities, including trailers, should be well maintained and free of objects that may cause bruising. Broken boards or rails should be fixed. Rails in milking parlors should be properly adjusted. All loading equipment should have non-slip flooring. This is especially important with breeding age animals so as to prevent injury when they are exhibiting signs of estrus.

Verification: Visual assessment of facilities (i.e. milking parlor, hoof trimming chute, loading chute, trailer). Vocalization scoring as an indicator of stress. Visual assessment of animal movement.



Expectation: When transporting animals, distress and discomfort should be minimized. Only animals fit for travel should be transported, unless animals are being transported to seek medical attention. Trucks and trailers used to transport animals should be safe and comfortable for the animals, proper loading densities should be maintained, and equipment should be operated by a trained, competent individual.

Background: Dairy cattle may be moved off of the farm for a variety of reasons. Care should be taken during transport to ensure the well-being of the animal.

Guideline: Recommended loading densities of trucks and parlor holding pens range from 12 square feet per head for 1,000 pound animals to 18 square feet per head for 1,400 pound animals (Grandin, 1981). These densities are not the absolute standard and must be adjusted for calves and special needs animals.

Note: Review “Top 10 Considerations for Culling and Transporting Dairy Animals to a Packing or Processing Facility” for additional information on transporting dairy cattle. This document can be found online at: nmpf.org/files/file/Top_10_Considerations_Electronic_Version.pdf.

Verification: Visual assessment of facilities (i.e. loading chute, trailer). Vocalization scoring as an indicator of stress. Visual assessment of animal movement.



WORKER EDUCATION

Guiding Principle: To promote animal well-being, animal caretakers should be appropriately trained and regularly supervised to ensure they follow protocols and meet professional expectations for appropriate animal care and handling.

Expectation: All individuals working with animals must be trained and regularly supervised to ensure they are competent and educated about protocols and able to follow them. If not, retraining must occur. Animal abuse must not be tolerated. Training (both written and verbal) must be provided in a language that is easily understood, especially in cases where workers are non-native English speakers. Training should be regularly updated to reflect current industry standards.

Background: A key component in facilitating animal well-being is having competent, well-trained employees. It is critical that employees receive training to:

- Recognize and understand basic animal needs .
- Rapidly diagnosis and treat illness or injury.
- Move, handle and transport animals in a manner that minimizes animal distress and is safe for the animal and caretaker.
- Competently perform euthanasia procedures.
- Understand and follow biosecurity measures.

Hired animal caretakers are important to the long-term viability of the dairy industry. It is critical that dairy owners and managers invest in the time to adequately train dairy farm employees. Training should be thought of as an investment into the employee that can mutually benefit the employee, the farm, the community, and the dairy industry at large.

Verification: Visual assessment of employees working. Review training protocols. Talk with employee(s).

Proper management promotes animal health and well-being and reduces the incidence of illness or injury.

To ensure proper management of animals, all individuals responsible for the caring of animals should be trained and regularly supervised.

Note: Resources for educating employees include the “Farm Animal Worker Training Program” available from the Federation of Animal Science. You can also contact your local veterinarian and/or extension agent to obtain training modules.



REFERENCES

Agriculture Canada. 1990. Recommended Code of Practice for the Care and Handling of Dairy Cattle. Agriculture Canada, Ottawa.

American Association of Bovine Practitioners. 1999. Practical Euthanasia of Cattle: Considerations for the Producer, Livestock Market Operator, Livestock Transporter, and Veterinarian. Online. Available: aabp.org/resources/euth.pdf.

American Veterinary Medical Association. 2008. Principles of Veterinary Medical Ethics of the AVMA. Online. Available: avma.org/issues/policy/ethics.asp#III.

California Dairy Quality Assurance Program - Dairy Welfare Evaluation Guide. 2004. University of California Agriculture and Natural Resources Cooperative Extension.

Caring for Dairy Animals - Technical Reference Guide and On-The-Dairy Self-Evaluation Guide. 2004. Agri-Education, Inc., Stratford, IA.

Dairy Cattle Welfare Critical Control Points. Temple Grandin. Alberta Farm Animal Care. Online. Available: afac.ab.ca/careinfo/handling/Grandincontrol.htm.

Dairy Management Inc, American Association of Bovine Practitioners, and National Milk Producers Federations. 2008. Top 10 Considerations for Culling and Transporting Dairy Animals to a Packing or Processing Facility. Online. Available: nmpf.org/files/file/Top_10_Considerations_Electronic_Version.pdf.

DeVries, T.J. and M.A.G. von Keyserlingk. 2008. Understanding Cow Behavior from a Nutritional Perspective. Tri-State Dairy Nutrition Conference. Online. Available: tristatedairy.osu.edu/Proceedings%202008/DeVries%20paper.pdf.

Eicher, S.D., J.L. Morrow-Tesch, J.L. Albright, J.W. Dailey, C.R. Young, and L.H. Stanker. 2000. Tail-docking influences on behavioral, immunological, and endocrine responses in dairy heifers. J. Dairy Sci. 83:1456-1462.

Eicher, S.D., J.L. Morrow-Tesch, J.L. Albright, and R.E. Williams. 2001. Tail-docking alters fly numbers, fly-avoidance behaviors, and cleanliness, but not physiological measures. J. Dairy Sci. 84:1822-1828.

Eicher, S.D. and J.W. Dailey. 2002. Indicators of acute pain and fly avoidance behaviors in Holstein calves following tail-docking. J. Dairy Sci. 85:2850-2858.

Eicher, S.D., H.W. Cheng, A.D. Sorrells, and M.M. Schutz. 2006. Short communication: Behavioral and physiological indicators of sensitivity or chronic pain following tail docking. J. Dairy Sci. 89:3047-3057.



Grandin, T. 1981. Livestock Trucking Guide. Livestock Conservation Institute. Bowling Green, KY. Online. Available: grandin.com/behaviour/rec.truck.html.

Grandin, T. 1998. Handling of Crippled and Nonambulatory Livestock. Animal Welfare Information Center Bulletin, Vol. 9, no. 1-2. Online. Available: nal.usda.gov/awic/newsletters/v9n1/9n1grand.htm.

Grandin, T. 2007. Outline of cow welfare critical control points for dairies (rev. March 2007). Grandin Livestock Handling Systems. Fort Collins, CO. Online. Available: grandin.com/cow.welfare.ccp.html.

Graves, R.E. and M.F. Brugger. 1994. Naturally ventilated freestall barns. *Expansion Strategies for Dairy Farms: Facilities and Financial Planning*. NRAES-77, pp. 409-417. NRAES: Ithaca, NY.

Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching. First Ed. 1999. Consortium, Association Headquarters, Savoy, IL.

Heinrichs, J. and B. Lammers. 1998. Monitoring Dairy Heifer Growth. Penn State College of Agricultural Sciences. Online. Available: pubwiki.extension.org/mediawiki/files/1/13/Monitoring_Dairy_Heifer_Growth.pdf.

Humane Farm Animal Care. 2004. Humane Farm Animal Care- Animal Care Standards for Dairy Cows March 2004. Herndon, VA. Online. Available: certifiedhumane.org/documentation.asp.

La Fontaine, D. and K. de Witte. 2002. Dehorning and castration of calves under six months of age. Online. Available: [transact.nt.gov.au/ebiz/dbird/TechPublications.nsf/C5AF1480C26CC23269256EFE004F648E/\\$file/804.pdf?OpenElement](http://transact.nt.gov.au/ebiz/dbird/TechPublications.nsf/C5AF1480C26CC23269256EFE004F648E/$file/804.pdf?OpenElement).

National Dairy Animal Well-Being Initiative. Principles and Guidelines for Dairy Animal Well-Being. Online. Available: dairywellbeing.org/guidelines.php.

National Research Council. 2001. Nutrient Requirements of Dairy Cattle: 7th rev. ed. Natl. Acad. Sci., Washington, D.C.

Schreiner, D.A. and P.L. Ruegg. 2002. Effects of tail docking on milk quality and cow cleanliness. *J. Dairy Sci.* 85:2503-2511.

Schreiner, D.A. and P.L. Ruegg. 2002. Responses to tail docking in calves and heifers. *J. Dairy Sci.* 85:3287-3296.

Stull, C.L., M.A. Payne, S.L. Berry, and P.J. Hullinger. 2002. Evaluation of the scientific justification for tail docking in dairy cattle. *J. Amer. Vet. Med. Assoc.* 220:1298-1302.



Tom, E.M., I.J.H. Duncan, T.M. Widowski, K.G. Bateman, and K.E. Leslie. 2002. Effects of tail docking using a rubber ring with or without anesthetic on behavior and production of lactating cows. *J. Dairy Sci.* 85:2257-2265.

Tucker, C.B. and D.M. Weary. Tail Docking in Dairy Cattle. *Animal Welfare Information Bulletin*, Winter 2001- 2002. Vol. 11 No. 3-4. Online. Available: nal.usda.gov/awic/newsletters/v11n3/11n3tuck.htm.

Tucker, C.B., D. Fraser, and D.M. Weary. 2001. Tail docking in dairy cattle: Effects on cow cleanliness and udder health. *J. Dairy Sci.* 84: 84-87.

Veenhuizen, M.A. 1994. Providing a healthy environment with proper ventilation. *Expansion Strategies for Dairy Farms: Facilities and Financial Planning*. NRAES-77, pp. 418-425. NRAES: Ithaca, NY.

Wildman, E.E., G.M. Jones, P.E. Wagner, and R.L. Boman. 1982. A dairy cow body condition scoring system and its relationship to selected production characteristics. *J. Dairy Sci.* 65:495-501.



ENVIRONMENTAL STEWARDSHIP



INTRODUCTION

The states of Oregon and Washington have responded to concerns about agriculture's impact on the environment, particularly with maintaining good water quality. Dairy farm families, their employees, and their animals all rely on the same natural resources as their neighbors, so protecting water quality is an important issue. Northwest dairy farmers have proactively worked with state agencies to develop a regulatory climate aimed to reduce the potential for contamination of ground and surface waters.

Maintaining appropriate facilities and proper management is imperative for protecting waters of the state. *Manure management facilities*, responsible *manure handling* practices and *record keeping and documentation* are all key factors for making sure water quality is protected. If at any time a dairy farmer is unable to meet water quality expectations, enforcement action can be taken.

Effective and progressive management to protect the environment remain an ongoing focus. This document details the commitment to environmental stewardship on Northwest dairy farms.

Further information about water quality protection practices and requirements of dairy farmers can be found at the Oregon Department of Agriculture Confined Animal Feeding Operation Program website (oregon.gov/ODA/NRD/cafo_front.shtml) or the Washington State Department of Agriculture Livestock Nutrient Management Program website (agr.wa.gov/FoodAnimal/Livestock-Nutrient/Livestocknutrient.htm).



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MANURE MANAGEMENT FACILITIES

Guiding Principle: Facilities should be designed and managed to effectively collect, store, and manage manure and process waste water generated by the dairy farming activities as a means to protect water quality.

A. ANIMAL HOUSING/BARNS

Expectation: Buildings used to house dairy cattle must be constructed and managed in a manner that will contain manure within the housing facility. Buildings also must function to keep rain and clean stormwater from mixing with manure.

Background: Dairy animals are commonly housed in barns, especially during wet weather. Manure generated in the housing facility must not discharge from the barn, so it is important that barns be constructed and managed to prevent discharges. Barn openings and gutters should be managed to exclude stormwater, helping minimize the total volume of waste to be handled. To promote animal health and well-being, manure is frequently removed from the barn. Manure is then transferred to a facility designed to store manure until it can be used as a nutrient source and applied to fields or exported off-site.

Investing in facilities specifically designed to collect and store manure and process waste water is important for protecting water quality.

Proper management of animal housing and manure storage facilities protects water quality and promotes animal health and well-being.

*Note: See **MANURE HANDLING** for more information about manure application and see **RECORD KEEPING AND DOCUMENTATION** for more information about exporting manure.*

Verification: Visual inspection of animal housing/barns.

B. MILKING PARLOR AND MILK HOUSE

Expectation: Waste water generated from milking parlor, milk house, and other dairy activities must be handled as a potential pollutant.



Background: After each milking, the milking parlor and milking equipment are cleaned. A significant volume of water is also used to clean out milk storage tanks after milk is hauled off of the farm. Since wash water often comes in contact with manure, it is treated like manure. Wash water generated from the milking operation should be directly transported to and stored in the manure storage facility. Water running off from feed storage areas also should be transported to and stored in the manure storage facility.

Verification: Visual inspection of milking parlor and milk house (drains, grates, pipes, etc.). Visual inspection of wash water entry point into manure storage facility.

C. MANURE STORAGE

Expectation: All manure and waste water must be stored in structures/facilities designed for this purpose.

Background: Facilities used to store manure and other dairy waste water must be appropriately designed. Manure storage facilities allow dairy farmers to collect and store manure until it is appropriate for the manure to be applied to crop ground and/or exported off the farm. Manure can usually be stored for several months, so it is critical for storage facilities to be properly designed and sized to protect water quality.

Verification: Visual inspection of manure collection and storage facilities. Review of construction/engineering plans for manure storage facilities. Review of current operational size.

D. OPERATION AND MAINTENANCE

Expectation: Waste handling equipment and storage facilities that collect, store, treat, or apply manure must be operated and maintained according to design.

Background: Waste handling equipment and storage facilities are generally designed for a specific purpose. To maintain the functionality of the equipment and facilities, they must be operated and maintained according to design. Failure to do so can affect integrity and functionality. Operation and maintenance procedures should be routinely reviewed with all employees involved with these operations.

Verification: Visual inspection of animal housing/barns, manure storage facilities, and waste handling equipment.



MANURE HANDLING

Guiding Principle: Application of manure to fields should be performed in a manner that is conducive to crop production and provides water quality protection.

A. MANURE APPLICATION

Expectation: Application of manure must be done in accordance with the approved Nutrient Management Plan. Consideration should be given to the rate (amount), timing, and placement of each manure application, as well as the nutrient content of the manure and projected crop utilization.

*Note: See **RECORD KEEPING AND DOCUMENTATION** for more information about Nutrient Management Plans.*

Background: Manure is a natural, organic fertilizer that provides nutrients and organic matter for soil health and crop productivity. Using manure as a fertilizer source reduces or eliminates the need for commercial fertilizer.

Manure generated by dairy cattle can be recycled and used as a fertilizer for crops. Proper manure application rates, along with appropriate timing and placement, must be practiced by the Northwest dairy farmers to ensure water quality protection.

I. APPLICATION RATE (AMOUNT)

Expectation: Manure application must be made at agronomic rates.

Background: The application rate of manure should match crop needs. Excess nutrients from over-application of manure can result in an accumulation of nutrients in the soil profile (such as nitrogen, phosphorus, and salts), leaching of nutrients to groundwater (such as nitrate), or runoff to surface waters. Because manure contains bacteria, over-application can also result in bacteria reaching and contaminating surface waters. Manure application rates should be adjusted based on factors such as crop type and stage, soil type, and timing.

Note: Assistance in determining appropriate application rates can be found in "Manure Application Rates for Forage Production" by T. Downing, D. Sullivan, J. Hart and M. Gamroth (2007).



Verification: Visual inspection of manure application area. Review manure application and crop yield records. Review documentation for calibrating manure application equipment. Review the most current soil tests and any available manure tests. Review Nutrient Management Plan and compare to visual inspection and records.

II. TIMING

Expectation: Manure must be applied during appropriate weather and crop conditions. Manure must not be applied to saturated soils or to an extent that large surface pooling occurs during application. Manure must be applied so runoff does not occur after application.

Background: When manure is applied to fields, the soil should be dry enough to retain and hold the manure within the soil profile. This allows crop roots to utilize the nutrients in manure for growth and avoids surface runoff.

Verification: Visual inspection of manure application area. Review manure application records and any available crop records. Review Nutrient Management Plan and compare to visual inspection and records.

III. EQUIPMENT

Expectation: Manure application equipment must be calibrated. During manure application, equipment should be monitored to assure the proper amount is delivered to the desired target field.

Background: Applying manure with calibrated equipment helps a dairy farmer deliver the appropriate amount of nutrients to the field during manure application.

Verification: Talk to owner or employee responsible for calibrating equipment. Review documentation for calibration of equipment. Review Nutrient Management Plan and compare to documentation.

B. BUFFERS (SETBACKS)

Expectation: Manure must not enter surface or ground water. In addition to appropriate application rates and timing, buffers must be used to reduce the risk of manure entering surface or ground water.



Background: When fields are in close proximity to surface water, additional measures must be implemented to provide protection of the adjacent water body. Buffers, also known as setbacks, are areas adjacent to water bodies where manure is not applied and are used as a tool for protecting water quality. Buffers serve as a filter in the event that surface runoff starts to occur. Buffers capture the runoff and prevent it from reaching surface water. Incline of the field, amount and type of vegetation in the buffer area, and the amount and type of manure applied are a few of the various factors that should be accounted for when determining the width of a buffer. The appropriate size of a buffer may vary by the time of year, with greater distances required for wet season applications.

Verification: Visual inspection of manure application and buffer areas. Review manure application records. Review Nutrient Management Plan and compare to visual inspection and records.



RECORD KEEPING AND DOCUMENTATION

Guiding Principle: All dairy farms must document manure management practices to manage nutrients appropriately.

A. NUTRIENT MANAGEMENT PLANS

I. REQUIREMENT

Expectation: All Northwest dairy farmers must have a written Nutrient Management Plan (NMP) that reflects current on-farm practices.

Background: Record keeping provides a “check and balance” for on-farm manure management activities.

The NMP is a technical document detailing manure management activities on the farm and serves three primary purposes:

- To prevent discharge of contaminated waste water to streams, ditches, or other surface waters.
- To prevent migration of contaminants to ground water.
- To supply crop nutrient needs.

Requirements for the NMP are determined by designated state institutions. A NMP contains a summary of the operation (herd size, acres of land, description of manure storage facilities, etc.), a nutrient application schedule and balance sheet, soil analysis, and other important information to protect water quality. Intentions should be to develop NMP’s that work to protect water quality as well as fit into practical management on a dairy farm.

Verification: Review NMP, comparing to requirements defined by the state, and check for consistency between current practices and plan elements.

Note: The Washington State Department of Agriculture requirements can be found online at: agr.wa.gov/FoodAnimal/Livestock-Nutrient/NutrientMgmtPlans.htm. The Oregon Department of Agriculture requirements can be found online at: oregon.gov/ODA/NRD/docs/pdf/awmp_minreq.pdf.

Documenting manure management is an important practice on dairy farms for water quality protection, as well as for crop production.

Records must be completed to assess on-farm practices and maintain a history of manure management activities.



II. REVIEW

Expectation: Once developed, the NMP must be submitted for review.

Background: Once the NMP has been developed, this document must be submitted for review by the State Department of Agriculture (in Oregon) or the local conservation district (in Washington). The document is reviewed for accuracy as well as feasibility.

The NMP must meet the state's criteria. If the NMP is not approved, then it is the Northwest dairy farmer's responsibility to make corrections and on-farm adjustments until the reviewing body is satisfied. Only when they are satisfied can the NMP be approved. Operating without an approved NMP can result in enforcement against the Northwest dairy farmer.

Verification: Review documentation to determine approval status of the NMP.

III. ON-FARM IMPLEMENTATION

Expectation: After the NMP has been approved, practices must be implemented on the farm as described in the plan.

Background: Once the NMP has been approved, Northwest dairy farmers need to implement the NMP. Inspections are performed by the State Departments of Agriculture in both states, at least every year or two, to determine if the dairy facilities and management activities performed are in compliance with their NMP and state regulations. Non-compliance can result in enforcement action against the dairy farmer. Plans should be updated, when necessary, to reflect changes in management, treatment, or structures on the farm.

Verification: Review NMP and compare to current farming practices.

B. RECORDS FOR MANURE APPLICATION

Expectation: All manure applications must be documented.

Background: Documentation of manure applications should be used to assist the dairy farmer with decisions for future manure applications (such as rate of application, location of application, etc.) and cropping decisions. Documentation helps maximize efficient use of the nutrients in manure for crop productivity and minimize the need for commercial fertilizers.



Guideline: Required documentation for manure application includes:

**Location of application*

**Amount of nitrogen and phosphorus applied*

**Date of application*

Verification: Review manure application records and any available crop records.

C. RECORDS FOR MANURE EXPORTATION

Expectation: All manure exported off of the dairy farm must be documented.

Background: Just as dairy operations must keep track of the manure being applied to crops, it is also the Northwest dairy farmer's responsibility to track the amount of manure exported off the farm. Since manure is a fertilizer, it may be used for its nutrient content by individuals other than dairy farmers (i.e. crop farmers, composters, gardeners). The recipient of exported manure is responsible for proper manure management practices.

Verification: Review manure export records.

D. SOIL SAMPLING

Expectation: Soil samples must be collected and analyzed from all fields where manure has been applied.

Background: Soil testing is a scientifically accepted practice to measure the levels of nutrients in the soil. Soil testing helps monitor the changing nutrient content of soils and the information is used by farmers to make decisions about future manure applications and crop planting.

Guideline: Information for collecting soil samples can be found in the Nutrient Management Plan. There are also two extension publications with specific details on soil sampling in the Northwest: "Monitoring Soil Nutrients Using a Management Unit Approach" is available online at: extension.oregonstate.edu/catalog/pdf/pnw/pnw570-e.pdf. "Post-harvest Soil Nitrate Testing for Manured Cropping Systems West of the Cascades" is available online at: extension.oregonstate.edu/catalog/pdf/pnw/pnw570-e.pdf.

Verification: Review current soil analysis and sampling frequency.



E. ANIMAL NUMBERS

Expectation: The number of animals on a dairy should be equal to or less than to the number used to write the NMP.

Background: Using the approved NMP, the maximum number of animals allowed on each farm is compared to the number on site. This practice is implemented to ensure farmers can effectively balance the amount of nutrients generated by their dairy animals, while protecting water quality.

Verification: Visual inspection of animals and comparison to allowed number of animals in NMP.



REFERENCES

Downing, T., D. Sullivan, J. Hart, and M. Gamroth. Revised 2007. Manure application rates for forage production. EM 8585-E. Oregon State University Extension Service. Online. Available: extension.oregonstate.edu/catalog/pdf/em/em8585-e.pdf.

Oregon Department of Agriculture Confined Animal Feeding Operation Program website: oregon.gov/ODA/NRD/cafo_front.shtml.

Staben, M.L., J.W. Ellsworth, D.M. Sullivan, D. Horneck, B.D. Brown, and R.G. Stevens. 2003. Monitoring soil nutrients using a management unit approach. PNW 570-E. Pacific Northwest Extension. Online. Available: extension.oregonstate.edu/catalog/pdf/pnw/pnw570-e.pdf.

Sullivan, D.M., and C.G. Cogger. 2003. Post-harvest soil nitrate testing for matted cropping systems west of the Cascades. EM 88-32-E. Oregon State University Extension Service. Online. Available: extension.oregonstate.edu/catalog/pdf/pnw/pnw570-e.pdf.

Washington State Department of Agriculture Livestock Nutrient Management Program website: agr.wa.gov/FoodAnimal/Livestock-Nutrient/Livestocknutrient.htm.



MILK QUALITY AND SAFETY



INTRODUCTION

Consumers want to know more about their food: where it comes from and how it was made. Producing safe, wholesome milk is of great importance to Northwest dairy farmers, and they proudly produce some of the highest quality milk in the nation.

Not only are dairy products some of the most nutritious foods available, they are also some of the safest. Milk and other processed dairy products account for less than 1% of all food-borne illness outbreaks. One of the primary reasons dairy products are so safe is because of the many quality and safety precautions established through every step of production and processing.

The milk produced on Northwest dairy farms must pass many requirements, inspections, and tests. The federal “Pasteurized Milk Ordinance,” a detailed document setting up criteria for milk safety inspections, is used in Oregon and Washington to regulate the production, transportation, processing, handling, sampling, examination, labeling, and sale of milk and milk products. Dairy farms, milk plants, receiving stations, transfer stations, milk tank truck cleaning facilities, milk tank trucks and bulk milk hauler/samplers are inspected by state agencies multiple times per year.

Achieving production of consistent high quality milk is accomplished by using appropriate *facilities*, *sanitary milk collection* practices and maintaining *milk safety*. This section details these commitments to producing safe, wholesome milk on Northwest dairy farms.

Further information about milk quality and safety practices can be found at the Oregon Department of Agriculture Dairy Program website (oregon.gov/ODA/FSD/program_dairy.shtml) or in the Washington State Department of Agriculture Dairy Farm Manual (agr.wa.gov/FoodAnimal/Dairy/DairyFarmManual.html).



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FACILITIES

Guiding Principle: Dairy facilities should be designed and maintained to promote the collection of safe milk that is of the best quality possible.

A. MILKING FACILITY

Expectation: A milking facility must be designed and maintained to promote cleanliness during milking. The interior of the milking facility should be kept clean. Floors, walls, ceilings, windows, pipelines, and equipment should be in good repair and free of filth and/or litter.

Background: Milking facilities are used to provide a safe, clean environment for cows and employees during milking. Milking cows in a clean facility helps minimize the opportunity for milk to become contaminated with environmental contaminants. Constructing the milking facility with materials that are easily cleaned promotes facility cleanliness. The design, construction, and maintenance of a milking facility must meet state and federal government guidelines.

Verification: Visual inspection of milking facility.

B. MILK HOUSE

Expectation: The cooling, handling, and storage of milk must take place in a milk house that is separate from other facilities on the dairy. All surfaces and equipment in the milk house must be clean. The washing, sanitizing, and storing of milk containers and equipment should be completed in the milk house.

Background: A milk house provides a suitable, separate place for the cooling, handling, and storage of milk. It also serves as a place to wash, sanitize, and store milk utensils. A milk house should be separate from animal housing/barns and the milking parlor to act as a safeguard against exposure of milk and milk equipment to environmental contaminants such as dust and manure.

Verification: Visual inspection of milk house.

A well designed and constructed milking facility and milk house is important for maintaining cleanliness and producing safe, high quality milk.

Animal housing should be designed and maintained not only to maximize animal comfort but to ensure that milk is produced by clean, healthy cows.



C. HOUSING/BARNES

Expectation: Facilities used to house milking cows should be cleaned regularly to promote animal cleanliness and hygiene.

Background: Milking clean cows reduces the opportunity for milk to be contaminated by dust, manure and/or mud. Not only is animal cleanliness and hygiene important for milk quality, it is also important for animal health and well-being. Manure should be regularly removed and bedding should be maintained to maximize cow cleanliness.

Verification: Visual inspection of animal housing/barns.

*Note: For more information about animal housing on Northwest dairy farms, please refer to the **ANIMAL CARE AND WELFARE** section of Northwest Sustainable Dairies.*



SANITARY MILK COLLECTION

Guiding Principle: On-farm practices should be implemented to ensure the milk collected and stored is safe and of the highest quality possible. Milk should be collected from **clean** cows in **clean** facilities with **clean** equipment and stored in **clean** storage units.

A. MILKING EQUIPMENT AND UTENSILS

Expectation: All milking equipment, utensils, and containers used in the handling, storage or transportation of milk should be made of material that is easily cleaned and in good repair. Milking equipment must be cleaned, operated, and maintained for optimum cow health and milk production.

Background: Properly functioning milking equipment is important for milking procedures. Poorly operating equipment is uncomfortable for the cow and can interfere with proper milking procedures.

Verification: Visual inspection of milking equipment and utensils.

Expectation: Once milking has been completed, all utensils and milking equipment should be cleaned and sanitized immediately. Milking equipment must also be sanitized before each milking.

Background: Milk quality and safety can be compromised if milk is able come into contact with unclean containers, utensils or equipment. Therefore, it is important for all surfaces coming into contact with milk to be clean to minimize potential contamination.

Verification: Visual inspection of equipment and utensils.

Cleanliness is a crucial component of producing safe, high quality milk.

The milking facility and all to the equipment used in the production and storage of milk must be cleaned regularly to prevent potential environmental contamination.

Attention must be focused on the proper hygiene of the cows and personnel during milking times.



B. PERSONNEL CLEANLINESS

Expectation: Hands must be clean and dry before milking, before performing any milk house function, and immediately after the interruption of any of these activities. Individuals responsible for milking cows should wear clean outer garments while milking or handling milk, milk containers, utensils, or equipment.

Background: The reasons for clean hands of the individuals milking cows are similar to the reasons a cow's udder should be clean. Hands may have been exposed to dust and manure during the course of their normal duties on the farm and at milking time. Because workers' hands frequently come into contact with their clothing it is important for clean clothes to be worn during milking and while handling milk.

Verification: Visual inspection of milking procedure. Visual inspection of hand washing area (access to soap, hot water, and clean towels to dry hands).

C. UDDER CLEANLINESS

Expectation: All milk cows' teats must be clean and dry before a milking machine is attached.

Background: High quality milk depends upon cow hygiene. Cleanliness of the teats is one of the most critical factors for protecting the quality of milk. Cleaning the teats before each milking removes dirt and manure that could potentially come in contact with milk. Cows' teats must be cleaned and sanitized with products that are safe for the teats, and teats must be dried before the milking machine is attached for milking.

Verification: Visual inspection of milking procedure. Visual inspection of product used for cleaning and sanitizing teats.

D. ANIMAL HEALTH

Expectation: Milk to be sold for human consumption must only be collected from healthy cows.

Background: High quality dairy products can only be made from high quality milk that is produced and collected from healthy cows. If a cow shows evidence of abnormal milk, is ill, and/or is receiving antibiotic therapy, milk from that cow must not be collected for sale and must be discarded to ensure it does not enter the human food supply. Milk must be discarded until it is deemed fit for human consumption. Failure to discard milk for the appropriate amount of time is not allowed and jeopardizes the quality and integrity of milk.

Verification: Visual inspection of cows, treatment records, and milk reports.



MILK SAFETY

Guiding Principle: Milk should be properly stored in a safe, clean place so as to minimize the chance of any contamination.

A. MILK COOLING

Expectation: Milk must be properly cooled to the appropriate temperature within the appropriate amount of time after each milking.

Background: Straight from the cow, the temperature of milk is about 97°F. Milk can spoil quickly at this temperature, so it is extremely important for the milk to be cooled quickly. Cooling milk quickly preserves its quality and integrity.

Guideline: Milk must be cooled to 50°F or less within four hours of the commencement of milking, and to 45°F or less within two hours after the completion of milking. The blended temperature of the milk after the first milking and subsequent milkings must not exceed 50°F (Grade "A" Pasteurized Milk Ordinance, 2007).

Dairy farmers implement multiple practices to ensure the safest milk is produced every day.

To further ensure the safety of milk, testing of milk for safety and quality must be completed from the time it leaves the farm until the time it arrives at the store.

Verification: Visual inspection of milk storage. Inspect temperature of milk.

B. STORAGE OF MILK

Expectation: All milk to be sold for human consumption must be stored appropriately.

Background: Once milk has been collected and cooled, all milk must remain refrigerated until it is hauled from the farm. When milk leaves the farm, haulers keep the milk cool as it is taken to a plant for processing. These practices maintain milk quality and safety and ensure that milk used in processing is of the highest quality.

Guideline: Milk must be stored at 45°F or less (Grade "A" Pasteurized Milk Ordinance, 2007).

Verification: Visual inspection of milk storage. Inspect temperature of milk and temperature monitoring devices.



C. STORAGE OF ANIMAL MEDICINES

Expectation: All animal medicines must be stored in a location where they cannot contaminate milk, the milking facility or the milking equipment. Prescription medicines must be properly labeled by a licensed veterinarian, and milking cow medicine must be segregated from non-milking cow medicine.

Background: Animal medicines must be properly stored so they do not come into contact with milk or milking equipment and contaminate the milk supply. The presence of antibiotics in milk is illegal and unsafe for human consumption.

*Note: For more information about antibiotic use on Northwest dairy farms, please refer to the **ANIMAL CARE AND WELFARE** section of Northwest Sustainable Dairies.*

Verification: Visual inspection of medicine labeling, medicine storage area, and veterinarian prescriptions.

D. STORAGE OF CHEMICALS

Expectation: Cleaners and sanitizers used for cleaning the milking equipment must be properly labeled and safely stored.

Background: Cleaners and sanitizers are used to maintain milking facility and equipment cleanliness. These cleaners and sanitizers are required to be properly stored and labeled to prevent contamination of milk.

Verification: Visual inspection of chemical storage and labeling.

E. MILK TESTING

Expectation: Milk quality must be monitored on all farms. All milk that leaves the farm must be tested for quality and safety.

Background: Every single time milk is picked up on a dairy farm a sample of the milk must be collected. These samples are usually all analyzed by the milk handler and every six weeks by regulatory personnel for quality and safety. Multiple milk samples are collected from the time milk leaves the farm until it is bottled or manufactured into dairy products to monitor quality and ensure there is no antibiotic residue. At any point, if milk quality and safety does not meet milk processor, state, and/or federal standards this milk must be immediately discarded and must not be used for the manufacturing of dairy products.

Verification: Review records of milk sample results.



REFERENCES

Grade "A" Pasteurized Milk Ordinance. Revised 2007. U.S. Department of Health and Human Services. Public Health Service. Food and Drug Administration. Online. Available: milkfacts.info/Federal/2007%20PMO-FINAL.pdf.



LABOR MANAGEMENT



INTRODUCTION

Labor costs account for one of the largest portions of any dairy farm's budget. Dairy farming is a labor intensive industry that requires a wide array of duties to be completed on a daily basis such as milking cows, feeding, health care, and facility management. In addition to the daily activities, employees are also typically needed for seasonal duties such as harvesting feed, applying manure, or irrigating crop land. Because of this, employees are an integral part for the success of a dairy farm.

Northwest dairy farmers recognize the importance of an employee's contribution to the farm. Since Oregon and Washington have two of the highest minimum wage levels in the nation, dairy employees in the Northwest typically receive higher wages than their counterparts in other parts of the nation.

From the first day an employee is hired, *farm labor regulations* need to be followed. Through organized and clear *communication*, employees should be able to understand what is expected of them. By giving special attention to *employee safety*, employees can also feel safe at work. At the end of the day, it is critical that employees receive fair *compensation* and be rewarded for good workmanship.

This document outlines these labor expectations and responsibilities associated with the Northwest dairy industry in greater detail.



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FARM LABOR REGULATIONS

Guiding Principle: State and federal regulations should be followed for all employees.

Expectation: Employers must abide by state and federal regulations for employing farm personnel.

State and federal regulations must be followed when hiring and managing employees.

Background: State and federal labor regulations outline procedures to be practiced with all employees:

- All dairy employees must receive at least the state minimum wage and be paid at least monthly.
- All dairy employees must receive meal and/or rest breaks (depending on time period worked).
- Employment specifications for minors must be followed.
- Records must be kept and made available to the appropriate entities upon request.
- New employees must complete an Employment Eligibility Verification form (I-9) . Employers must verify the employment eligibility and identity documents presented by the employee and record the document information on the form. The completed form must be retained.
- Employers provide Workers' Compensation Insurance to cover costs associated with injuries or illness from the workplace.

Note: Labor requirements for the State of Washington can be found at: lni.wa.gov/. Labor requirements for the State of Oregon can be found at: boli.state.or.us/.

Verification: Review appropriate documents. Talk with employee(s) and employer.



COMMUNICATION

Guiding Principle: Effective communication is essential for providing a positive, understandable, and safe work environment.

Expectation: Communication with employees should be performed in a manner that is clearly understood by employees and documented. Written employee handbooks and manuals should be developed that clearly explain workplace policies and procedures.

Background: Communication is important in every aspect for every business. For dairy farms, this should include several key areas:

- Hiring and firing procedures
- Training materials
- Standard operating procedures
- Employee reviews

Formal documentation of these materials helps employees clarify what is expected of them and lessens the potential for legal challenges resulting from poor communication practices.

Verification: Review documentation materials available for employees.

A. STANDARD OPERATING PROCEDURES

Expectation: Standard operating procedures (SOPs) should be prepared and made available to all workers. Standard operating procedures should be provided in a language that is easily understood, especially in cases where workers are non-native English speakers. Employees should receive training associated with each SOP they are responsible for.

Communication with employees should be clear and concise for the benefit of the employee, the dairy cattle, the environment, and milk quality and safety.

With proper training, employees will have a clear understanding of what is expected of them and how management decisions are implemented.



Background: Well-written SOPs provide direction, improve communication, reduce training time, and improve work consistency (Stup R., 2001).

Veterinarian advice is recommended when developing animal health-related SOPs.

Note: For assistance writing SOPs, refer to “Standard Operating Procedures: A Writing Guide.” found online at pubs.cas.psu.edu/freepubs/pdfs/ud011.pdf.

Verification: Review SOPs. Talk with employee(s) and employer.

B. TRAINING

Expectation: All employees must be trained and have adequate supervision to ensure they are educated and competent within their job duties. If not, retraining may be necessary. Training (both written and verbal) should be provided in a language that is easily understood, especially in cases where employees are non-native English speakers. During training, ample opportunity should be provided to answer an employee’s questions. Documentation of training, and retraining, should also be completed.

Background: Training is the single most important job undertaken when hiring a new employee (Keown, 2005). Training can: help orient new employees to their new work environment, enable employees to fulfill their job duties in a safe, appropriate manner, help reduce the potential for problems that can arise due to improper operating procedures, and lead to more efficient running of the dairy farm. Training is an investment into the employee’s future and mutually benefits the employee, the farm, the community, and the dairy industry at large.

Training should go beyond basic standard operating procedures (SOPs) because SOPs by themselves are not sufficient to teach all of the appropriate working skills (Stup, R). For example, when training employees how to assist with a difficult calving, the SOP will likely explain in a step by step fashion how to assist; but knowing things such as when to assist, how to use good hygiene, and why things should be done a certain way are more thoroughly taught with hands-on training or the equivalent.

*Note: Information about animal care can be found in the **ANIMAL CARE AND WELFARE** section of Northwest Sustainable Dairies. Information about milk collection can be found in the **MILK QUALITY AND SAFETY** section of Northwest Sustainable Dairies. Information regarding the handling of manure can be found in the **ENVIRONMENTAL STEWARDSHIP** section of Northwest Sustainable Dairies.*

Verification: Visual assessment of employees working. Review training protocols. Talk with employee(s) and employer.



SAFETY

Guiding Principle: Careful effort should be focused on creating a work environment that is as safe as possible.

A. WORKPLACE SAFETY

Expectation: The workplace must be safe for all workers. Workers must be properly trained in safety procedures. Unsafe conditions must be corrected immediately.

Background: Safety should be a priority issue on the farm. Improving farm safety can result in fewer accidents, lower injury and illness rates, decrease workers' compensation costs, increase employee morale, and lower production losses.

A safe workplace is extremely important for employee, as well as dairy cattle, well-being.

Dairy farm safety should be promoted through proper training, and effective communication.

Note: Information for workplace safety is available through the Oregon Occupational Safety and Health Administration (OR-OSHA) or Washington State Division of Occupational Safety and Health (DOSH). Both Oregon and Washington offer confidential, no-cost safety, health, or ergonomic consultation for dairy farms. In Oregon, information about consultations can be found online at cbs.state.or.us/osha/consultation.html or by calling (800) 922-2689. In Washington, information about consultations can be found online at lni.wa.gov/Safety/Basics/Assistance/Consultation/about.asp.

Verification: Review training protocols. Observe hazardous work areas. Talk with employee(s) and employer.

B. EMERGENCY RESPONSE PLAN

Expectation: An Emergency Response Plan should be developed and easily accessible to dairy farm workers. The plan should be written in a language(s) understood by all workers.

Background: In the event of an emergency (flood, fire, etc.) rapid communication is essential. The Emergency Response Plan should include the name(s) and phone number(s) of important people to contact (such as the herd manager, owner, and veterinarian) and be posted in a prominent location(s) on the farm that can be easily accessed by employees. The Emergency Response Plan should also be written in a language(s) that is easily understood by workers. The Emergency Response Plan should be made a part of regular safety/training meetings with the employees.

Verification: Review Emergency Response Plan. Talk with employee(s) and employer.



COMPENSATION

Guiding Principle: Compensation of employees should be fair and good work should be rewarded.

Expectation: Workers must be compensated for work completed on the dairy farm. Compensation should be fair, based on the current labor market, and reward good job performance.

Background: Employee compensation should be fair, equitable, and competitive for the market. Providing fair compensation is valuable for retaining competent farm employees. Compensation may not be limited to employee wages. Compensation may also include insurance benefits, incentive programs, employee housing, retirement plans, or personal use of company vehicles or equipment. It is important for incentives to be concrete and measurable. Items to consider in making compensation fair include: length of employment, employee responsibilities, amount of training, and incentives for performance.

Workers should be compensated for good job performance on the farm.

Compensation can include a variety of rewards, but should be fair and appropriate.

Note: A compensation survey can be conducted to determine if employee compensation is fair. A survey is available online at the Dairy Herd Management website: dairyherd.com/directories.asp?pgID=724&ed_id=4579.

Verification: None, due to confidentiality.



REFERENCES

Keown, J.F. 2005. Managing dairy labor. G1584. University of Nebraska-Lincoln Extension, Institute of Agriculture and Natural Resources. Online. Available: ianrpubs.unl.edu/epublic/live/g1584/build/g1584.pdf.

Roefeldt, S. 2005. Does your compensation stack up? Dairy Herd Management. Online. Available: dairyherd.com/directories.asp?pgID=724&ed_id=4579.

Stup, R. Milker Training Strategies: Translating Theory Into Practice. Penn State Dairy Alliance. Online. Available: dairyalliance.psu.edu/pdf/TrainingMilkers.pdf.

Stup, R. 2001. Standard operating procedures: A writing guide. Penn State College of Agricultural Research and Cooperative Extension. Online. Available: pubs.cas.psu.edu/freepubs/pdfs/ud011.pdf.



ENERGY



INTRODUCTION

Responsible use of energy sources, identifying energy conservation strategies, and developing new renewable and sustainable energy options are all high priority topics, whether it be in government circles, environmental groups, or in the dairy industry. The energy discussion also goes hand in hand with discussion about greenhouse gas emissions and the carbon footprint resulting from business operations or lifestyles.

Electrical energy use on dairy farms typically accounts for 2 to 5% of total production costs. Of that, milk production can account for 50 to 70% of this energy used on the farm. The majority of the electrical energy is used for milk collection, powering motors and vacuum pumps, and cooling milk. Dairies also use electricity to heat milking equipment wash water, ventilate animal housing areas, and light buildings.

Other energy uses on the farm include fuel and fertilizer. Fuel includes diesel, gasoline and natural gas. Diesel tractors are generally used on a daily basis for routine duties such as feeding, cleaning, bedding, handling manure, and working in fields. Natural gas can be used to heat water in lieu of electricity. In some cases, synthetic fertilizers can be used to supplement organic fertilizer sources. Since synthetic fertilizer is either from fossil fuels (nitrogen based) or mining (phosphorus based), the use of it increases the energy demand of a dairy farm and also can increase air emissions.

Northwest dairy farms also rely on renewable energy sources to power their operations. A few dairy farms in Oregon and Washington have invested in anaerobic digesters, collecting gas from manure and using it to generate electricity. Capturing what would otherwise result in greenhouse gas emissions and turning it into energy production benefits everyone.

Through *energy analysis*, *energy conservation*, *energy efficiency* and promotion of *renewable energy* sources, dairy farms can use energy efficiently, reduce the cost of doing business, conserve energy resources and benefit the environment.

This document details the commitment to responsible energy use on Northwest dairy farms.



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ENERGY MANAGEMENT

Guiding Principle: Energy should be used responsibly on dairy farms, and opportunities to conserve energy or utilize renewable energy should be promoted.

A. ENERGY ANALYSIS

Expectation: Dairy farm owners should complete an energy self assessment and/or an on-farm energy audit performed by a qualified individual.

Background: Energy analysis is the very first step towards reducing energy usage and the costs associated. Self assessments and/or energy audits can help identify effective ways to reduce energy use on the farm. Self assessments can be completed by using online calculators. Energy audits can be completed by hiring an independent, qualified third party. Either method will provide information about the current use of energy as well as estimate potential energy saving opportunities. Understanding the farm's energy helps make energy improvement decisions, such as upgrading equipment.

Note: Self assessments of energy use on dairy farms can be completed by using one of the following online calculators: 144.92.31.19/conservation/dairy/default_dairy.aspx and energyexperts.org/. An NRCS Energy Consumption Awareness Tool is available at ahat.sc.egov.usda.gov/.

Contact your local PUD or utility provider to determine if energy audits are available. Federal grant money is available to offset some energy upgrade costs from the Farm Bill and available through USDA.

Verification: Check for completed self assessment and/or energy audit.

Finding ways to use energy efficiently and focus on energy conservation is important not only for general sustainability of agriculture, but can provide significant cost savings for dairies.

Energy analysis of current energy use can help identify potential energy savings and efficiency improvements.

Renewable energy opportunities exist for dairy farms. A few dairies in the Northwest already use anaerobic digesters to convert methane gas from manure into "green" electricity.



B. ENERGY CONSERVATION

Expectation: Dairy farms should promote energy efficiency through conservation practices.

Background: The easiest way to improve energy conservation practices may be to change current behavior. Behavior changes can include such things as turning off lights when they are not in use, using fuel-saving practices (i.e. reducing tractor idle time), cleaning and maintaining equipment, and applying fertilizers at appropriate, agronomic rates. Efforts should be made to make changes that will conserve energy.

Note: For more information about on-farm energy use and conservation refer to the “Energy Savings Guide for Dairies”.

Verification: Visit with manager(s).

C. ENERGY EFFICIENCY

Expectation: Dairy farms should use energy efficiently through responsible use.

Background: Energy efficiency can go beyond basic conservation practices and emphasize the performance of normal activities while using minimal energy input. Cost savings is often found as a result of using more energy efficient equipment. Major efficiency improvements that may prove valuable on a dairy farm include the use of variable speed drives on vacuum pumps, in-line milk coolers, or scroll compressors. Other changes may be as simple as installing more efficient washing machines, water heaters, and lights. More efficient irrigation scheduling can reduce pumping energy use. Considering more efficient crop rotations and production systems can conserve nitrogen, tractor fuel, and other precursors to gas emissions.

Note: To learn more about the equipment and technologies available to improve dairy farm energy efficiency refer to “Best Practices: Energy Savings for Your Dairy”. In addition, online self assessment calculators may be used to calculate potential energy savings with equipment upgrades.

Verification: Visit with manager(s).



D. RENEWABLE ENERGY

Expectation: Dairy farms should consider renewable energy options when feasible.

Background: Renewable resources are those that can be naturally replenished. Northwest dairy farmers are actively looking for ways in which renewable energy production can be incorporated on the farm. Solar power is a feasible means to power an electric fence or a pump for livestock watering. Anaerobic digesters, a newer example of renewable energy being used on several Northwest dairy farms, capture methane gas from manure and use the gas to heat water or generate electricity. The byproduct from anaerobic digesters can be used as a good crop fertilizer with fewer odors than most dairy manure. Depending on their location, dairy farms can also use solar, wind, hydro, or geothermal energy for direct heating or to offset electricity use.

Note: Information about renewable energy can be found in “Renewable Energy and Energy Efficiency: Opportunities for Oregon’s Agricultural Producers”.

Verification: Visit with manager(s).



REFERENCES

Best Practices: Energy Savings for Your Dairy. 2008. Energy Trust of Oregon. Online. Available: energytrust.org/pe/EnergySavingsGuideForDairies.pdf.

Dairy Farm Energy Management Handbook, Wisconsin Department of Agriculture, Trade & Consumer Protection. Online. Available: datcp.state.wi.us/fs/environment/dfmh/pdf/dfmh.pdf.

Energy Pyramid. 2007. EnSave. Online. Available: ensave.com/page.php?PID=8&Page=Downloads&CID=199.

Energy Saving Guide for Dairies. 2008. Energy Trust of Oregon, Inc. Online. Available: energytrust.org/pe/EnergySavingsGuideForDairies.pdf.

Renewable Energy and Energy Efficiency: Opportunities for Oregon's Agricultural Producers. 2008. Oregon Department of Agriculture. Online. Available: oregon.gov/ODA/docs/pdf/energyandag.pdf.



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