
Good Manufacturing Practices- Employee Instructions

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Good Manufacturing Practices

Why employ good manufacturing practices?

There are three significant reasons for using good manufacturing practices (GMPs) in all areas of your processing facilities:

- 1) Providing safe, high quality dairy products for the consumer makes good business sense.
- 2) They are mandated by the Food and Drug Administration's Code of Federal Regulations (CFR), specifically 21 CFR Part 110, GMPs.
- 3) They are mandated by the Wisconsin Department of Agriculture, Trade and Consumer Protection's Administrative Code, specifically Chapter ATCP 80, Dairy Plants.

An effective HACCP plan is supported by good manufacturing practices (GMPs) and a strong prerequisite program. This section will focus on how GMPs aid in producing safe and high quality products. Everyone, including visitors, outside contractors, office staff, maintenance, upper management, and laboratory personnel are required to adhere to the GMPs while in production or other designated plant areas.

All employees and visitors should be made aware of GMPs. Employee training is critical for GMP compliance. Training new employees at the time of hire and yearly thereafter is a guideline for effective training programs. To document training, a signed statement indicating that employees have read the policies set forth, they understand those policies, and they are willing to adhere to them is necessary. This document is to be maintained by the HACCP coordinator.

Employees should be encouraged to approach their supervisor when they see GMPs not followed or when they see a need to amend the policy.

There are many GMPs a company can implement. The degree to which these are implemented is dependent upon the size, practicality and ability of the company to bear the expenses of the GMPs. The GMP policy will represent and be customized to your needs. The following practices are guidelines to consider employing when developing a GMP policy.

What are good manufacturing practices?

Good manufacturing practices specify many of the production and process controls to prevent contamination of food. The objective of GMPs is to prevent adulteration (or contamination) of food that is produced for human consumption. Adulterated food is defined as food that "is manufactured under such conditions

that are unfit for food" or food that "has been prepared, packed, or held under unsanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health".

Most of the day-to-day operational food safety rules in your plant are in place because GMPs require them to be there. Maintaining constant awareness of food safety and following proper procedures help contribute to a safe, high quality food product you can be proud to produce.

There are two main categories of GMPs:

- Employee practices and good personal hygiene, and
- Equipment and plant cleanliness

Employee practices and good personal hygiene include:

- ✓ Uniforms
- ✓ Footwear, Footbaths and Footfoamers
- ✓ Hair
- ✓ Jewelry
- ✓ Fingernails
- ✓ Hand Washing, Hand Sanitation and Glove Use
- ✓ Health Practices
- ✓ Food, Drink, Candy, Gum, Cough Drops

Equipment and plant cleanliness include:

- ✓ Plant and Equipment Cleanliness and Sanitation
- ✓ Interior and Exterior Maintenance
- ✓ Pest Control
- ✓ Storage of Ingredients and Products
- ✓ Plant Chemicals
- ✓ Process Control

Each of these GMP procedures and processes are covered in this manual. Implementing these various GMP programs will provide the basis for building a solid prerequisites program and create the foundation for developing and implementing a HACCP-based food safety program.

Cross-Contamination

Preventing cross-contamination is a basic goal of all food safety programs and procedures. Cross-contamination occurs when bacteria, dirt, or extraneous matter on one surface are transferred to another surface via direct contact. There are many sources of cross-contamination in a manufacturing facility. Each source can be controlled with the efforts of all personnel. Below are particular areas of concern. This is not all-inclusive, but provides examples of certain areas of particular concern. Cross-contamination will be frequently mentioned as these areas of concern are discussed in further detail within this document.

- **Traffic patterns:** Visitors and plant personnel can bring bacteria, *Listeria* for example, into the plant from outside. Without proper control visitors and plant personnel traveling throughout the plant can contaminate all areas of the facility. Footbaths and foot foamers can help reduce the potential for *Listeria* and other bacterial contamination. Plants should institute a traffic control plan, and Wisconsin law requires a foot sanitation plan to help guard against cross-contamination.
- **Raw Ingredients:** Finished product can easily become contaminated by coming into contact with raw materials. Separating finished product from raw ingredients and materials can alleviate this potential. Using dedicated containers for finished and raw products exclusively can also help to alleviate this potential.
- **Airflow:** Airflow is a major contributor to contamination of product and equipment. Proper ventilation can help. Keeping doors closed and tightly sealed helps to reduce the amount of outside air from coming into the plant. Installing and maintaining suitable air filters (especially for air being introduced into production areas) can help to reduce air containing detrimental bacteria, yeast, mold and foreign materials such as dust and insects. These air filters should be of sanitary design. It is necessary to maintain a positive air pressure in production, packaging and starter rooms to significantly reduce potential cross contamination.
- **Employee practices:** Employees unwittingly transfer dirt and bacteria from clothes or hands to food or food contact surfaces. Wash and sanitize hands carefully, wear gloves when handling finished products, wear clean uniforms, and do not contact clean and sanitized equipment with dirty uniforms or aprons.
- **Equipment:** Equipment such as fork lifts, pallet jacks, carts and floor cleaners that travel throughout the plant must be well maintained and

clean to control potential cross-contamination.

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Uniforms

Uniforms are a common way to introduce contamination into the plant and the product. Contamination can be of both a biological and physical nature. Outside clothing can introduce hair, bacteria, dirt, buttons, or other contaminants. One way to reduce contaminants in the plant is to provide uniforms and footwear for all employees involved in production. An additional measure of protection is provided when the uniforms and footwear do not leave the plant and a locker room is provided for changing and uniform storage. Alternatives are suggested below if this is not possible.

When uniforms are provided:

- White uniforms for dairy plants are standard for production personnel. A distinguishing color may be worn by management and maintenance as described below. Laboratory coats, smocks or plastic disposable aprons are recommended for all management personnel or plant visitors.
- Personnel who work in the maintenance department should wear a distinguishing color such as blue or brown. In this way, when maintenance on equipment is performed during production, there is a greater opportunity for other employees to notice and follow up with sanitation procedures before restarting production on that piece of equipment.
- Ideally, uniforms should not leave the facility except for cleaning. If employees take uniforms home, a policy of not touching pets or doing yard or farm work while in uniform before reporting to work should be initiated. In this manner, animal hair, dander, dirt, bacteria and other potential cross-contamination sources will be minimized.

Clean uniforms should be provided daily:

- Daily uniform change should be provided, thus several sets of uniforms are needed for each employee. This minimizes the amount of dirt and other debris that can be transferred to the equipment, product and plant environment from dirty uniforms.
- A clean uniform should be worn at the start of each production day and placed in a designated “used uniform” container at the end of production. Used uniforms should be handled properly so they do not become a source of contamination.

- Freezer jackets or other outerwear should be cleaned when needed and at least monthly. These types of jackets have a history of collecting dirt leading to contamination of products.
- Avoid contacting cleaned and sanitized vats or other equipment with dirty uniforms or aprons.

When working in refrigerated or freezer areas:

- With the exception of freezer jackets or other outerwear, any additional clothes should be worn under the uniform exposing the cleaned uniform on the outside. Additional clothing should be of a cotton type and non-pilling material.

Avoid uniform shirts containing pockets above the waist:

- Items placed in shirt pockets may fall into product when bending over. To avoid the temptation of putting items in pockets, uniforms should not contain pockets above the waist. If uniforms contain top pockets, it is recommended to sew these pockets shut.

Purchase uniform shirts or laboratory coats that snap instead of button:

- Buttons can inadvertently fall into the product.

When uniforms are not provided:

- If possible, employees should have dedicated clothes and footwear that are only worn during work.
- Clothes that pill or shed, such as mohair, are to be avoided. Tightly woven cotton fabrics are best suited for plant attire.

If locker rooms are provided:

- Employees should change into their work clothes and footwear upon arriving at work.
- Clothing should remain at work or be taken home for cleaning, if the company does not provide such service.

If locker rooms are not provided:

- A policy of not touching pets or doing yard or farm work while in work clothes before reporting to work should be implemented. In this manner, animal hair, dander, dirt, bacteria and other potential cross-contamination sources brought into the plant will be minimized.
- Dairy plant personnel may live on farms. The farm environment can introduce numerous contaminants to clothing such as animal hair, bacteria, and soil. These employees must be trained regarding the hazards that can be introduced to the production facility if locker rooms are not provided and they change at home. If animals are contacted before coming to work, a shower and complete change of outside clothing and footwear is necessary.
- A designated spot for “plant only” footwear storage should be set up to prevent this footwear from being worn outside the plant. This will minimize bacteria from soil being brought into the plant.

Type of street clothing:

- Light colored clothing should be worn because it will show dirt more clearly, initiating a change or washing of clothing.
- No clothing containing pockets above the waist or buttons should be allowed. Items placed in pockets above the waist or buttons may fall into the product.
- No tank tops should be worn. Tank tops do not cover the worker properly and do not protect food and equipment from sweat and hair.
- Employees with street clothes who are directly handling product should wear aprons or smocks to cover their clothing.

When new employees do not receive a uniform immediately upon hire:

- Refer to section “when uniforms are not provided” on page 7 of this chapter.

Under no circumstances should aprons or laboratory coats be worn into the bathroom. Hooks should be provided outside the bathroom.

Footwear, Footbaths and Footfoamers

Proper footwear and properly maintained footbaths/footfoamers are important aspects of employee, food, and environmental safety. Appropriate footwear reduces worker injury from slipping on wet floors. Footbaths/footfoamers reduce potential cross-contamination by aiding in removing dirt and debris that would otherwise be tracked into the plant. Wisconsin's ATCP 80.08(4)(d) specifies that all entrances to a processing area in which exposed dairy products are processed must have footbaths or other means to maintain a clean and sanitary environment. The deeper the footbath capacity, the greater the sanitization efficacy. Also, water and sanitizer evaporation rate will be lessened, reducing the need to refill footbaths throughout the day. Footbaths should be checked or refilled as needed, and cleaned daily.

No open toed footwear or sandals worn by visitors or employees should be allowed:

- For employee and visitor safety, open toed footwear or sandals should be prohibited.
- They do not protect against hot liquids, acids, and caustics used in the facility.
- Such footwear does not protect the facility from contamination from feet.
- Such footwear offers no protection against heavy or sharp objects that may accidentally drop on an employee's foot.

Shoes worn by employees should have a slip resistant sole:

- If the footwear does not have slip resistant soles, water, oil, some sanitizers and product residues on floors may cause an employee to fall.
- Sole grooves should be kept at a maximum of a quarter of an inch. The greater the groove depth, the more dirt and other debris that may become trapped and contaminate the plant.

Footbaths/Footfoamers:

- Footbaths/footfoamers help to eliminate dirt and debris on footwear from being tracked into the plant, thus decreasing the potential for cross-contamination from bacteria.

- Footbaths should be cleaned daily, including the floor under and around the footbath.
- Improper maintenance and operation of footbaths/footfoamers can cause bacterial cross-contamination. Footbaths should be monitored frequently throughout the day to insure that the correct concentration of sanitizer is present at all times during production. Footbaths should be cleaned to control residual bacteria. Footfoamers should present a satisfactory coverage to the plant entrance throughout the production day.
- Automated footfoamers provide a good alternative to manually maintained footbaths.

Employees should not step over footbaths:

- Step into the footbath so that the sole and arch on footwear come in contact with the sanitizer. The sanitizer will not damage footwear.

Hair

Hairnets and beard snoods should be kept at all production entrances allowing easy access by all employees and visitors.

Hairnets are to cover the entire head (front, back and sides) and include all hair: Often bangs or hair in back of the head is excluded from coverage within the hairnet. This practice should be avoided. All employees in production, packaging or other plant areas should be trained on proper hairnet usage:

- Hair restraints are required by Wisconsin law (ATCP 80.10(2)(a) and should be worn at all times in production areas or all areas where product may be exposed within the plant. Hair itself and its microorganisms may contribute to product contamination.
- Hair restraints should be made of solid material rather than open "netting material".

Beard snoods are to be worn by those employees or visitors with sideburns, mustaches and beards.

Mustaches, beard and sideburn maintenance by employees:

- Mustaches, beards and sideburns must be closely trimmed and maintained at a length of not more than ¼ inch.
- Trimmed mustaches should not fall below the lower lip or extend past the edge of the mouth.

Jewelry

No jewelry should be allowed in production areas. Before entering these areas, employees, visitors or non-production employees should be instructed to remove all jewelry with the exception of medical alerts.

Jewelry should not be worn in production areas:

- Jewelry cannot be cleaned and sanitized properly and can lead to microbial contamination.
- Jewelry or its components can fall into product.
- For employee safety, jewelry should not be worn as it may catch on equipment.
- Plain wedding bands without grooves may be worn. For those who cannot physically remove rings, gloves should be worn.

Permanent earrings; eyebrow, nose, tongue, or lip piercing:

Ideally, no jewelry should be worn in production areas. However, it is up to the judgment of plant management to allow limited types of jewelry.

- Employees with permanent piercing tend to touch their face or tongue more frequently, increasing the chance of *Staphylococcus aureus* contamination from face to hands to product and equipment.
- Using tape or band-aids to cover jewelry is not sufficient because these items can come loose, falling into product or into equipment.
- If employees have rings that are not removed easily, they should wear gloves. Gloves prevent dirt and product from accumulating within hard to clean grooves within rings. They also help to prevent rings catching on equipment causing employee injury.

- Ideally, those employees or potential employees wearing a “permanent piercing” should be encouraged to remove them in order to retain employment.

Medical alert bracelets / necklaces:

- By no means should an employee be discouraged from wearing this type of life-saving jewelry.
- Necklaces are a better alternative than bracelets and should always be kept underneath clothing. Necklaces should be taped to the inner portion of the shirt or chest. Shirts should then be tucked in to prevent the necklace from being lost if it falls from around the neck.
- Any medical alert tags should be documented at the start and end of the shift and if they cannot be accounted for, management should be notified for potential placement of product on hold.

Fingernails

Recent scientific studies have proven that fingernails are a common source of contamination. Dirt and bacteria build up underneath fingernails. The longer the fingernails, the greater the concentration of dirt and bacteria. Men and women both should keep their fingernails short (no longer than 1/8 inch) to help minimize bacterial contamination.

- Short fingernails facilitate washing and reducing dirt accumulation.
- Fingernails should be kept clean and trimmed at all times.
- Longer fingernails cause holes in gloves.

Fingernails should remain free from fingernail polish, decals or false fingernails:

- Polish or decals may chip off and fall into the product and may lead to bacterial or physical contamination.

Visitors entering the production area who are wearing fingernail polish or artificial nails should wear gloves.

Hand Washing, Hand Sanitation and Glove Use

People normally carry at least 150 different types of bacteria on their bodies and over 400 different types of bacteria within their bodies. Many of these bacteria can cause foodborne illnesses if transferred to a food product. These bacteria are called “normal flora” and most people do not even know they are carriers. Bacteria found on the skin will not make that person sick but might make someone else sick if transferred to food.

Therefore, when a person touches food, any bacteria on the skin may be transferred. People who eat that food may become ill and in some cases die depending on the type of bacteria that are transferred (cross-contamination). To avoid cross-contamination, proper hand washing is essential. Glove use is strongly recommended when touching finished products that are not yet packaged.

It is important to remember that gloves are meant to protect the food from the employee and not protect the employee from the product. Because hands can easily transfer pathogens, it is necessary to properly wash and sanitize hands:

- Experiments have shown that hands need to be washed for at least 20 seconds to see a significant decrease in number of microorganisms on the surface of the hand.
- When washing, hands need to be scrubbed vigorously in the crevices of the hand, fingertips, under fingernails and the space between the fingers with warm water and soap.
- It is recommended that hand washing training be instituted during GMP training.
- Hand washing stations should be installed at all entrances to the production and packaging areas and near work stations. These stations must include warm water, soap, towels, trash container and sanitizer.
- Hand washing instructions should be provided for all employees. Periodic swabbing or plating of hands/finger residues on Petri plates may be one way for management to monitor this GMP, and can indicate the need to repeat training.

Change gloves or wash and sanitize hands or gloves at the following times (This is not an all inclusive list):

- Before starting work
- Before handling finished products.
- After using the restroom.
- After touching nose, mouth, face, or hair.
- After handling raw product.
- After handling cardboard products.
- After eating, drinking, or using tobacco.
- After sneezing or coughing, after blowing or wiping nose.
- After any absence from the work area or any other reason for leaving the workstation.
- After handling garbage, soiled equipment / parts.
- After picking objects off the floor.
- After performing any maintenance tasks on equipment.
- After handling personal belongings (street clothing, purses, cosmetics, etc.).
- Gloves themselves may be a source of contamination. If gloves are torn or damaged, they should be disposed of. If gloves have missing pieces, management should be notified as this may be a source of a physical hazard/foreign object in the product.

If heavy sweating occurs during glove use:

Heavy sweating in gloved hands can be an ideal environment for bacterial growth if hands are not properly washed and sanitized and bacteria are not removed before putting on gloves. Since most people do not wash their hands for the requisite 20 seconds, bacteria will routinely be present. Therefore a warm environment and water from sweat are all the components needed for bacterial growth and multiplication. Therefore, to

avoid bacterial build up within the gloves:

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- Properly wash and sanitize hands before putting on gloves.
- Change gloves more frequently or to avoid sweat build up, wear cotton liners.
- Keep fingernails to 1/8 inch or less in length.

Gloves should not be clear or white:

- Provide gloves that are colors such as purple, red, blue or green. If gloves tear and fall into the product the clear glove parts will be difficult to see. Colored gloves will be more easily seen when damaged.

Health Practices

Employee health and hygiene, directly or indirectly, are important aspects of food safety and sanitation. Sick employees and poor hygienic practices rank second among the causes of foodborne illnesses.

To avoid the possibility of foods becoming contaminated with pathogenic microorganisms associated with employees who are ill, the following personal hygiene practices should be strictly enforced:

- Supervisor notification is required when employees report to work with any type of illness including colds and sinus infections.
- The following conditions will prohibit persons from handling products. Special attention should be paid to those employees who handle heat treated products. This includes those who touch product contact surfaces such as maintenance or sanitation employees.
 - ✓ Persons experiencing diarrhea or vomiting.
 - ✓ Persons with contagious diseases, severe colds or conditions that result in runny noses.
 - ✓ Persons with wounds, boils or sores on hands, arms or face.
- Minor cuts on hands or arms should be treated promptly by washing with warm water and soap.

- After washing, cover hands with gloves. Minor cuts on arms should not be covered with band-aids to prevent the band-aid from falling in the food product. If for some reason a band-aid is required, it must be of a type such as the blue colored food industry band aids that are designed to set off the metal detection system.
- Injuries on the hands and the lower portions of the arms such as cuts, abrasions, burns and even a hangnail must be cleaned and treated immediately. Often these injuries become infected, and as a result, can contribute to the potential contamination of food and equipment with disease causing bacteria.
- Supervisor notification should be required for those handling finished products with a rash or sore to determine alternate duties that can be done until the rash or sore is healed.

Food, Drink, Gum and Cough Drops

Food brought into the plant by employees can be a source of bacterial contamination. Food and crumbs attract rodents and insects that can spread disease-causing bacteria, rodent droppings and hair to all parts of the manufacturing facility. Food and beverages should only be consumed in the lunchroom or authorized break areas. Lunchroom or break areas must be kept neat and clean to avoid attracting pests. After breaks, employees need to wash and sanitize their hands when returning to the process area.

- Food should not be removed from lunchroom or break areas.
- Food, beverages and raw milk samples should be prohibited in production, shipping, storage, and warehouse areas.
- Food and beverages should not be kept in locker rooms or toolboxes.
- If possible, a separate employee refrigerator should be kept in the break room for storage of employee lunches. If food is kept in plant coolers or freezers, maintain a designated area, away from products, for storage.
- If food is kept in plant coolers or freezers, maintain a designated area, away from products, for storage.
- Eating product on the production line is prohibited.

- Candy, gum, toothpicks, all tobacco products, and cough drops should only be consumed/used on break and disposed of properly before returning to work. These items require hand-to-mouth action and increase the potential for bacterial contamination.

Plants should have designated smoking areas:

- Cigarettes should be prohibited from all production, warehouse and work areas.
- Employees should immediately wash and sanitize their hands after smoking breaks.
- A cigarette butt receptacle should be provided in the break area and near outside doors to aid in keeping these areas clean. These receptacles should be cleaned daily.

Plant and Equipment Cleanliness and Sanitation

Employees should be made aware of general concepts of cleaning and sanitizing that are done in the plant. GMP training should be given to new employees and used annually for retraining current employees on plant policies and practices. All employees are to sign off and date that they have read and will comply with company policies. This documentation should be maintained within the HACCP plan.

Equipment should be cleaned and sanitized after each use:

- If product is allowed to remain and accumulate on equipment, it will be harder to remove and will be suitable for microbial growth.
- Equipment must be clean before sanitizing. Food residue must be removed before a sanitizer can be effective.
- When cleaning dirty equipment next to newly cleaned and sanitized equipment, make sure not to contaminate the newly cleaned equipment.
- Never clear a drain with a pressure hose. This may create an aerosol of drain contents into the surrounding environment and increase the opportunity for pathogen contamination.
- After cleaning, place COP parts on specifically identified and sanitized

carts or in storage.

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- When reassembling clean parts, only cleaned tools should be used.
- Hoses should be stored properly with nozzle or end opening off the floor when not in use.

Types of cleaning and production utensils:

- All utensils and other items that come in contact with product containing an allergen [see allergen listings in HACCP Program section on allergens] must be labeled and designated for use only with that allergen-containing product unless thoroughly cleaned after each use and sanitized before each use.
- Hard bristle brushes and green scrub pads will scratch stainless steel surfaces. Microorganisms may become embedded in the scratched areas. A biofilm could form which is an invisible matrix of microorganisms embedded in protein, fat, minerals and carbohydrates. It may not be easily removed from a surface. Scratches in stainless steel create an opportune surface in which biofilms can form. It is known that some sanitizers may not be effective against killing microorganisms embedded in biofilms.
- Never use steel wool; hard bristled brushes, or green scratch pads in food processing plants. They scratch equipment leading to crevices in which bacteria and product residue can become lodged, resulting in contamination. Green scratch pads may contribute physical contamination to foods [they have a history of pieces falling off].
- Sponges should not be used as they disintegrate and may contaminate product. Sponges harbor bacteria and cannot be cleaned. Single service towels or paper towels may be used. Single service towels are disposed of daily after use.
- Utensils should be cleaned and sanitized frequently, during use and after each shift. Utensils not properly cleaned and sanitized can easily cause cross-contamination.
- Utensils that come in direct contact with products should be stored in COP sanitizing tanks between uses, or be sanitized before use.
- Employees should replace utensils showing cracks and/or damage.

- Avoid hollow-handled utensils. These may allow product buildup within the handle, making them difficult to clean and be a harborage for bacteria.
- Wooden handled and wooden utensils should never be used. Microorganisms have been found in the cracks and crevices within the wood, and are difficult to remove through cleaning.
- All cleaning brushes should be color-coded and stored on hooks/racks and not on the floor.
- Ideally, dedicated cleaning supplies for each area should be used to avoid cross-contamination from raw areas to finished product areas.
- All brushes and pails should be color-coded and used only for their intended purposes. Below are examples of industry-recognized color coding schemes:
 - ✓ White/Blue = Finished product contact surfaces
 - ✓ Black = Drains
 - ✓ Red = Rework or raw materials
 - ✓ Yellow = Floors
 - ✓ Green = Allergen
 - ✓ Brown = Sanitation

Interior and Exterior Maintenance

All employees should assist in keeping the plant clean and well maintained. Cleanliness is a reflection on the plant and the employee's commitment.

The exterior of the facility should be well maintained and clean:

Trash, pallets, overfilled dumpsters, equipment, cigarette butts and weeds attract insects, rodents, and other animals that carry microorganisms. Insects, rodents and bacteria can easily make their way into the plant increasing the potential for food contamination.

- Plant grounds, parking lots, and loading docks should be free from litter and clutter.
- Trash should be contained in one area, kept covered, and cleared from under and around dumpster areas.

- Outside storage should be greater than 20 feet from the building.
- Remove weeds, foliage or other vegetation from around perimeter of plant buildings.
- If possible, pave all driveways since excess dust is raised by cars or trucks on unpaved surfaces.
- Pallets should not be stored outside. They are a vehicle for entry of pests and pest excrement into the plant. If pallets are stored outside, they must be inspected and cleaned before use.
- No standing water should be allowed. This is a breeding ground for bacteria, insects (especially mosquitoes), an attraction for animals and birds.

In processing areas:

- Remove any litter when present and immediately clean up any spills.
- Remove any debris that has collected in or around drains to reduce microbial growth.
- Standing water promotes microbial growth. Food particles and dirt found in standing water may result in rapid microbial growth that can be tracked throughout the plant on footwear, hand trucks and forklifts.
- Only use a brush properly identified (color-coded: black) for drain cleaning.
- Return brushes immediately after use to a properly designated area for cleaning and sanitizing. Store each brush properly in this specified location. Make certain to separate the drain brush from other brushes.
- Wash your hands thoroughly after cleaning these brushes.
- Eliminate walkways and platforms where exposed product might be contaminated.

Lighting is critical to employee and food safety:

- Good lighting is necessary for both the safety of the employee and for the product [reference requirements in ATCP 80.08(5)].
- All lighting fixtures must be shielded with shatterproof shields or non-breakable bulbs to prevent broken glass from contaminating product or supplies.

The plant structure should be in good condition:

- Employees should report needed repairs to management or appropriate plant personnel. A written work order system should be considered.
- Processing plant and storage structures must have roofs that are free from leaks. Leaks can result in damaged products, bacterial contamination and residues from bird droppings.
- Walls, floors, and ceilings should be kept in good repair with no evidence of paint chipping, cracks or brick and tile missing or damaged. These areas are ideal harborages for microorganisms.
- Walls and ceilings should be constructed of a smooth, waterproof, and easily cleanable material.
- Cracked or broken windowpanes should immediately be reported to maintenance for repair.
- Exterior walls with cracks or holes should be immediately repaired to control pest entry into plant.

Avoid condensation over open product whenever possible:

- Condensate, like standing water promotes bacterial growth. When condensate collects on equipment, floors, walls, pipes, and ceilings, it contains bacteria and dirt and this condensate may easily drip onto or into finished products.
- Insulating pipes, correct equipment placement, keeping covers on equipment closed and covering exposed product are ways to control condensate from dripping onto or into product.

- Insulation that is damaged or torn should be reported to your supervisor. Both microorganisms and foreign material from the insulation can lead to product contamination.
- Drains from air cooling units should go directly to a floor drain. These air cooling units must be maintained to keep the drain open to prevent the pan from overflowing.

Filters in the air systems must be maintained, clean, and in good repair:

- Dirty or damaged filters allow foreign material, insects, and microorganisms to be distributed in the plant.
- If possible, maintain positive air pressure in all finished product rooms.
- Ideally, air should flow from higher pressure finished product areas to lower pressure raw products areas to avoid cross-contamination.
- Keep all doors closed, especially those leading to production areas.
- A policy for replacing and documenting filters should be established.
- If air intakes are located on the roof, remove bird nests and other contamination sources from the area. Watch for standing water that may harbor bacteria and encourage bird activity.
- Do not direct fans to blow directly on conveyor belts or finished products that are not packaged.
- Air handling units should be constructed so that no condensate or standing water is in the interior of the unit. This has the potential to harbor *Listeria* sp. among other bacteria.
- Ideally, air filters for critical areas should be of the HEPA type.

Pest Control

Insects and rodents can contaminate finished products and stored ingredients. All plants must have a sound pest control program in place. Additional pest control information can be found in the Pest Control section of Prerequisite Programs in Chapter 3.

Below are ways employees can help control insect and rodent infestation:

- Keep all doors closed and make sure that they are tight fitting. Notify your supervisor if a door does not close tightly.
- Windows should close tightly leaving no room for insects or rodents to enter. All windows that open should be covered with an intact screen. Any door that remains open should be covered with an intact screen.
- All doors and windows should have molding/caulking or weather stripping that is in good repair. Any loose fitting door or window should be repaired [openings that shows light coming in from the outside]. Openings as small in diameter as a pencil may allow rodents to enter.
- All vent openings should have intact screens.
- Pipeline openings through walls should be completely sealed.
- A supervisor, maintenance personnel, or other appropriate personnel should be notified immediately whenever insects, rodents or droppings are observed in any area of the plant.

Take the following precautionary measures to decrease insect and rodent harborage:

- Keep lawns mowed and eliminate weeds.
- Eliminate pools of standing water.
- Eliminate uncovered trash.
- Do not allow trash to accumulate.
- Maintain storage areas in good condition.

- Store product, raw materials, and supplies no closer than 18 inches from walls in storage areas.
- Notify a supervisor if you notice a rodent or insect trap in bad repair.
- Paved surfaces around buildings deter insects/rodents.
- All rodent and insect traps should be numbered and in a designated and similarly numbered location. Location is designated on a map of the facility as well as with a marker stuck to the wall with adhesive.

Storage of Ingredients and Product

Always keep storage areas clean and free of clutter and dust to reduce the risk of microbial contamination and insect/rodent harborage.

Always follow First In – First Out (FIFO) procedures for materials and ingredients:

- This insures the freshest ingredients possible.
- This reduces waste by using items before their expiration date.

Always properly label, seal, and date containers of all partially used ingredients and packaging materials:

- This protects the product by keeping lids on containers at all times.
- All pails should be labeled with their contents and the date the pail was received. If ingredients are transferred or separated into smaller amounts, each individual container should be labeled appropriately.
- Do not store pails or bags of ingredients directly on the floor.

Store ingredients and product in separate, uniquely colored containers. A suggested coding for colors include:

- Finished Product = White/Blue
- Waste = Black
- Rework = Grey
- Raw = Red
- Allergens = Green

- Sanitizing Agents and Cleaners = Brown

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- It is recommended that along with color-coding, colored tags should also be labeled with the type of item being placed in the container. For instance, black buckets should also be labeled with a tag labeled “WASTE”.

Never store product or ingredients adjacent to waste, inedible materials or containers of cleaner/sanitizer. Never use product containers to store any other type of material. Clean and sanitize ingredient containers after each use to prevent microbial contamination. Store all cleaned and sanitized ingredient and product containers inverted off the floor:

- Food material left in containers can lead to microbial growth and contamination of equipment and product throughout the plant. Do not allow product to build up in rework containers for extended periods during production.
- Do not store rework containers directly on floor.
- Clean all raw material containers on the outside before they are brought into processing areas.
- Open containers carefully and in a sanitary manner to prevent possible contamination.
- Remove the first layer of a multi-layered bag, if possible, before allowing it in a process area.
- Limit the amount of cardboard that enters a process room. Cardboard is notorious for harboring bacteria, yeast, mold, and dirt which may come into contact with product and equipment.

Store all ingredients and packaging material off the floor on pallets in good repair. Do not store supplies directly on the floor. This includes intermediate containers for ingredients such as jugs, pails or other items used to transport ingredients. Use plastic pallets that are in good repair:

- Discard broken pallets.
- Store all ingredients, packaging material and other supplies off the floor to prevent contents from becoming wet, soiled, damaged, or contaminated.

Any rework or product in question should be placed on “hold” until tested or else discard immediately:

- Each plant should have a documented process for handling rework, including storage time, temperature and testing if required. A written procedure is needed to control rework handling and storage.

Plant Chemicals

Recent national events have heightened the need for increased bio-security measures. To avoid the potential for chemicals to contaminate the food supply, increased chemical security is necessary.

- Any dangerous substances such as pesticides, flammable materials, cleaning supplies, and solvents should be stored in a locked area away from product, ingredients, and packaging materials.
- Ideally, all chemicals should be stored in a locked cage or room.
- Employees should be aware of where the chemicals are stored.
- All employees should receive training in chemical handling and safety.
- All cross-contamination with chemicals should be reported immediately to plant management.

Process Control

During the food production process, there are numerous activities done that help to reduce introduction of hazards. Examples of control steps are given below:

- Each plant should have a receiving Standard Operating Procedure (SOP) for liquid and dry ingredients.
- Each plant should have a policy not to receive items into inventory in which the package is damaged to the extent that the item is exposed.
- No repaired packaged products should be received into inventory.

- When blending dry ingredients, operate an exhaust system to prevent dust dispersion and prevent microbial and allergen cross-contamination.
- Prepare any liquid slurry just before use. This helps to maintain lower slurry temperatures which will minimize microbial growth and toxin production.

Periodic shutdowns occur during normal production for a variety of reasons. Care should be taken to control product temperature and protect product against cross-contamination.

- If maintenance is involved to re-establish product flow, extra care should be taken to control cross-contamination.
- Often rework is generated by shutdowns. Employees should be alerted for proper handling to control cross-contamination.
- Corrective action should be taken to correct problem and documented.

Always check and document the following when incoming ingredients or products arrive. A company policy should be established that determines a plan of action if products arrive out of specification:

- Assay temperature of incoming liquid products not in sealed containers.
- Determine compliance with company specifications through Certificates of Analysis (COA) or supplier guarantees for each product.
- Verify product codes and quantities with the Bill of Lading.
- Note evidence of any damage. Damage can indicate the possibility of contamination by insects, microbes, or foreign material.
- Note wet trailer floors, packaging, or product.
- Note trailer that has off odor or is in poor condition.

To avoid damage from occurring, move raw materials and products carefully:

- If damage does occur, clean up any spills immediately, and either dispose of material or validate with analysis to insure it is safe for use.

Do not leave containers of lubricants or solvents sitting on equipment:

- Only use approved lubricants at recommended amounts.
- Store lubricants and solvents in correctly marked cabinets.
- The incorrect lubricant can cause a chemical hazard when in contact with product or equipment.

Summary

GMPs are often the hardest policies to enforce. Changing the habits of employees takes constant management supervision. It is often the GMPs that are the cause of audit deficiencies. Therefore, education and leadership by management can help employees become aware of their role and how to correctly follow the policies. It is important for employees to communicate with their supervisors/managers when they see a need to improve or modify the GMP policy.

Each plant will have a good manufacturing practice policy that is unique and specific to the activities within that plant. The policy should be tailored to the company, its needs, and its history. All employees including managers, office personnel, maintenance and production personnel must follow the good manufacturing practices to insure effective operation of the plant. Visitors and outside contractors must also be included in all GMP practices for total effectiveness.