MILK PROCESSORS: BIOSECURITY PERFORMANCE STANDARDS FOR RAW MILK COLLECTION AND TRANSPORT DURING AN FMD OUTBREAK

Excerpt from: Biosecurity Performance Standards (BPS) for Raw Milk Collection and Transport, September 2017, available at: www.securemilksupply.org/Assets/SMS-BPS-Raw-Milk-Collection-Transport-Factors_FINAL.pdf

- Numbers below are NOT in order; they reflect the original sections of the BPS document

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Purpose

This document describes the recommended biosecurity performance standards for **dairy processing plants** to implement for raw milk movement within the processing plant from dairy premises in a foot and mouth disease (FMD) regulatory Control Area. FMD is a highly contagious foreign animal disease that infects cattle and other cloven-hooved livestock, such as swine, sheep, goats, and deer. FMD is not a public health or food safety concern. FMD has been eradicated from the U.S. since 1929 but it is present in many other countries and causes severe production losses in animals. The movement of milk from a dairy premises is not without risk. Processing plant personnel need to ensure FMD virus in raw milk is not spread to susceptible species by vehicle movement, on clothing or footwear.

1. INFORMATION ABOUT FOOT AND MOUTH DISEASE

1.5 Destroying the virus

FMD virus can be destroyed chemically or thermally. The U.S. Environmental Protection Agency (EPA) has registered commercial disinfectants for use against the foot-and-mouth disease virus. During a large-scale FMD outbreak, there may not be a sufficient supply of readily-available EPA-registered commercial FMD virus disinfectants. In that case, the EPA may authorize the use of additional selected chemical disinfectants by the U.S. Department of Agriculture, State Departments of Agriculture, and selected individuals under certain circumstances to disinfect surfaces potentially exposed to FMD virus. Disinfectants are only effective if used appropriately. For more information about disinfectants, please see http://www.cfsph.iastate.edu/pdf-library/FMD-Resources/DisinfectantsForFMDVirus.pdf

Normal high temperature short time (HTST) pasteurization (161°F [72°C] for 15 seconds) significantly reduces the viable FMD virus in milk with a pH <7.0, but does not completely eliminate it. Processing plants in the U.S. may pasteurize at slightly higher temperatures and slightly longer times than this, but there is no research on virus elimination with these slight changes. Heating milk to 100°C (212°F) for 20 minutes will inactivate the virus.

For more information about FMD, see:

- Foot and Mouth Disease Fact Sheet
  http://www.cfsph.iastate.edu/Factsheets/pdfs/foot_and_mouth_disease.pdf
- OIE Foot and Mouth Disease, Disease Card
  http://www.oie.int/fileadmin/Home/eng/Media_Center/docs/pdf/Disease_cards/FMD-EN.pdf
- OIE Terrestrial Animal Health Code, Foot and Mouth Disease Chapter
- http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_fmd.htm

The following sections include the Biosecurity Performance Standards that apply to Milk Processing Plants and Personnel

4.3 Milk Samples

4.3.1 Milk sample vial(s) collected/picked up on farm; the performance standard is to ensure no visible contamination on the exterior of the disinfectable outer container (plastic sealable bag).

4.3.1.1. The labeled sample vials should be stored in a sealed plastic bag that has had the exterior sprayed with an approved disinfectant.

- Disinfectant must not come into contact with the milk or the interior or exterior of the vial.

4.3.1.2 The milk hauler/driver places the bagged sample collection vial(s) within the sample cooler (in a rack if possible) on the milk tanker for delivery to the dairy processing plant.

- Sample coolers must be made of a material that can be cleaned and disinfected.
  - Coolers visibly contaminated with milk, mud, or manure should be cleaned and disinfected at the processing plant.

6. Off-Loading Raw Milk at a Dairy Processing Plant

Milk processing plants are a commingling location for raw milk trucks/tankers, employee vehicles, and vehicles bringing supplies and taking away finished products. These vehicles and their drivers may be carrying FMD virus on their equipment, clothing, and footwear. There are no susceptible animals on the same premises as the processing plant, so the risk of FMD introduction and spread to livestock at these locations is low. However, the plant is an area where cross-contamination of vehicles and drivers can occur from milk trucks/tankers that have picked-up milk on infected, but not yet detected farms or have become externally contaminated during transit. These vehicles and drivers do present a moderate to high risk for transferring contaminated environmental media or milk to other vehicles.

Plant employees that care for or have susceptible animals at home need to take precautions to prevent transporting FMD virus on vehicles, clothing, and footwear. BPS are described to minimize the risk of plant employees transporting FMD virus to susceptible animals.

The ability to C&D trucks/tankers at the processing plant will be affected by location, water availability, regulations for waste water, and climate differences. In an FMD outbreak, steps taken by all industry partners to reduce the infectious burden of FMD virus in the environment, on trucks/tankers, roadways, and commingling locations will contribute to the overall success of controlling this highly contagious disease. Therefore, best practices are described aimed at decreasing the infectious burden. Processing plants and animal health officials are encouraged to work together to determine the best options that reduce FMD virus spread and aligns with local capabilities and regulations.

6.1 Establishing Traffic Patterns on the Processing Plant Premises

Traffic patterns for raw milk trucks/tankers and all other vehicles should be established to minimize cross-contamination while on the plant premises. All traffic involved in raw milk movement (e.g., vehicles, people, etc.) should be limited to a designated entry at the processing plant. If possible, separate entrances should be established for all other vehicles (finished product, employees, supplies, etc.) to minimize cross-contamination of raw milk trucks/tankers that may travel to or near dairy premises with susceptible animals.

Only the licensed milk hauler/driver is allowed to be in the cab as it enters the processing plant premises. Raw milk trucks/tankers entering a processing plant premises should follow specific biosecurity practices.

6.1.1 Before entry, the performance standard is for dairy plant personnel to record all vehicle and people movements involving raw dairy products.

- The milk hauler/driver must be prepared to provide date, time of arrival and departure, origin of tanker, driver name, contact number, vehicle identification, and dairies from which milk was collected from prior to arrival at the plant (names and locations).
- All records of vehicle and people movements onto the processing plant premises should be maintained and made available to animal health authorities in the event it is needed for a trace back or trace forward investigation.

6.1.2 Whenever possible, the performance standard is for the milk hauler/driver to remain in the cab until the processing plant personnel have cleared the tanker for off-loading.

- If the milk hauler/driver must exit the cab for any reason, follow protocols under section 4.1.2.

6.1.3 Trucks/tankers should be inspected for evidence of milk leakage upon entry; the performance standard is for dairy plant personnel to look for visible milk on the tanker exterior and in the storage compartment and notify the driver.

- If noted, the cause should be resolved prior to future transport by that driver or tanker to minimize raw milk leakage at subsequent pickups on dairy premises.
- Residual milk on the exterior and within the storage compartment should be removed through the cleaning process, prior to picking up milk on a dairy premises.

6.2 Raw Milk Tanker Exterior Cleaning and Disinfection

Conducting C&D of raw milk trucks/tankers at the processing plant is one additional step toward reducing the infectious burden of FMD virus in the environment, especially when tanker C&D cannot be accomplished on the dairy premises during raw milk collection.

6.2.1 The performance standard is for processing plant officials and animal health officials to work together to determine the best options for tanker C&D to reduce FMD virus spread that aligns with response goals, local capabilities and regulations.

6.2.1.1 BEST PRACTICE: Raw milk trucks/tankers should have their exterior surfaces, tires, undercarriage, and storage compartment cleaned and disinfected with the goal of removing any material that may contain FMD virus from conveyances before picking up milk at subsequent dairy premises with susceptible animals.

- Adhering to plant established traffic patterns is also essential to ensure organic material is not picked up on the plant premises before the raw milk tanker leaves.
- The location of the C&D station(s) could be at one or more of the following areas and meet the above goal:
    a. Before or upon entry to the processing plant premises
    b. Within the milk receiving bay
    c. Before leaving the plant premises
    d. At an approved off-site location

6.2.1.2 Plant mitigation plans should describe the location, personnel and equipment needed to operate a C&D station for conveyances entering their premises.

- The area where the tanker is cleaned and disinfected should be free of dirt/mud (ideally on a hard/solid or well-drained gravel surface).
- The milk hauler/driver should remain in the cab of the milk tanker.
    a. If the milk hauler/driver must exit the cab for any reason, follow protocols under section 4.1.2
- Training will be needed to ensure personnel are safely and effectively implementing the recommended protocols.
- The C&D station will be periodically monitored as determined by the Incident Management Team.

6.2.1.3 The milk tanker should be cleaned as described in section 7 (focusing on the tires, wheel wells, undercarriage, mud flaps, splash guards, steps, storage compartment) to remove visible contamination.

- Use the least amount of water necessary.
- Run-off/effluent from the C&D station must be managed such that it does not come in contact with susceptible animals and waterways (including ditches, streams, wetlands) and meets all applicable state, local and municipality regulations.

6.2.1.4 The milk tanker should be properly disinfected with an approved disinfectant that is applied for the recommended wet contact time per label directions.

- EPA-approved disinfectants against FMD virus can be found at: http://www.cfsph.iastate.edu/pdf-library/FMD-Resources/DisinfectantsForFMDVirus.pdf.

6.3 Milk Haulers/Drivers at the Processing Plant

6.3.1 Exiting the cab of the tanker, the performance standard is to prevent raw milk from contacting exposed skin, street clothing, and footwear.

6.3.1.1 The tanker cab should be considered and maintained as a clean, non-contaminated zone.

- The cab door should be considered a "Vehicle Door Boundary" between the cab and potentially contaminated outside areas.
- Adequate supplies of clean gloves, protective outerwear and footwear for a full shift of milk collection and delivery should be kept in the cab.
- Processing plants should keep a supply of protective wear (boots, gloves) in the event the hauler's supply becomes depleted, damaged, or excessively contaminated.

6.3.1.2 If milk haulers/drivers are not involved in milk unloading procedures. They should put on protective footwear, at a minimum, prior to exiting the cab.

6.3.1.3 If on farm bulk tank samples were collected, the hauler should wear gloves and provide the previously disinfected, sealed bag(s) to designated plant personnel or drop-off locations.

6.3.2 Exiting the cab of the tanker, the performance standard is no direct contact with other personnel.

6.3.2.1 Haulers NOT responsible for tasks involving raw milk contact (off-loading or cleaning pumps/hoses/collection equipment), should go directly to and remain in, the designated area (break room).

- Haulers should have no direct contact with processing plant personnel, other haulers/drivers, raw milk handling equipment, or other milk transport vehicles.
- Haulers should not enter the milk processing area.
- Haulers should adhere to all plant protocols designating foot traffic and use of facilities.

6.3.3 Returning to the cab of the tanker, the performance standard is removal of all protective gloves and footwear.

6.3.3.1 The tanker cab should be maintained as a clean, non-contaminated zone which requires removing disposable protective outer clothing, footwear and gloves or clean and disinfect waterproof gear and footwear prior to entry.

6.4 Personnel Involved in Raw Milk Receiving

6.4.1 Plant personnel or haulers responsible for tasks involving raw milk contact (collecting tanker sample for antibiotic screening, off-loading/assisting with off-loading/cleaning pumps, hoses, and collection equipment, working in the lab), the performance standard is to prevent raw milk on their clothing and footwear from leaving the designated raw milk handling areas of the plant.

6.4.1.1 Cross-contamination of raw milk with finished product should be avoided by designating areas specific to personnel handling raw milk.

- Gloves, clothing or protective outerwear/footwear worn while handling raw milk should not be worn in areas of the plant where pasteurized milk or milk products are processed, handled, or stored.
  - This includes lab personnel testing raw milk samples.
- If not already part of the plant's operating protocol, a boot bath, with product effective at killing FMDv, should be placed between the receiving room and the milk processing section of the plant.
  - All personnel crossing between the areas must use the boot bath.
  - The boot bath must be kept free of organic debris and the disinfectant solution changed frequently to remain effective.
- Raw milk samples/paperwork, etc. should be moved from the receiving area in a manner that prevents the raw milk receiver from entering the processing plant.

6.4.1.2 Clothing or protective outerwear/footwear worn while handling raw milk should not leave the plant premises without cleaning and disinfection to minimize the potential for transporting FMD virus from the plant to premises with cloven-hooved livestock.

- This could be accomplished through dedicated work clothes and footwear that remains, and is laundered, at the plant.

6.4.1.3 All employees who have contact with cloven-hooved livestock (cattle, sheep, goats, or pigs), should arrive at work showered, in clean street clothes and footwear, prior to changing into their plant-issued clothing and footwear.

6.4.1.4 PPE protocols for raw milk handling is presented in section 9.3.

6.4.2 When collecting tanker samples, the performance standard is to not spill milk on the outside of the tanker.

6.4.2.1 A collection bucket should be used for the disposal of the first two milk samples collected. The bucket and contents can be disinfected and neutralized prior to disposal into the sanitary sewer.

- Sample collection areas and equipment should be cleaned and disinfected in between each tanker with a food grade disinfectant that is effective against FMD (see http://www.cfsph.iastate.edu/pdf-library/FMD-Resources/DisinfectantsForFMDVirus.pdf).

6.4.3 During off-loading milk, the performance standard is to address raw milk spills immediately.

6.4.3.1 Raw milk spilled on the floor or ground during the connection/disconnection of the plant transfer hose(s) should be rinsed into the drain as soon as all connections are made and before personnel walk through the area.

6.4.4 After off-loading milk, the performance standard is to ensure no residual raw milk in the tanker and hose leaks upon leaving the processing plant.

6.4.4.1 After off-loading of milk is complete, the storage compartment and/or valve area should be rinsed off prior to sealing all access points on the tanker.

- All equipment on the tanker, including valves and fittings, must be maintained in good repair to prevent leakage of milk from these points on the tanker.
- After milk off-loading is complete and the inlet valve is closed, any milk spilled around the valve or within the storage compartment should be cleaned and the surfaces disinfected immediately prior to replacing dust cap or closing the storage compartment doors.

6.4.4.2 The Pasteurized Milk Ordinance (PMO) requires CIP of milk trucks/tankers once every 24 hour period when in use.

- Evidence for internal tanker cleaning is monitored by seals on all access points and a wash tag identifying time/place of last interior tanker cleaning.
- Complete CIP of the tanker after each off-load may not be possible in many situations (lack of CIP equipment, lack of waste water permits, lack of off-loading capacity for incoming loads, etc.).
- A sanitary rinse may not be possible due to the lack of a permit for waste water disposal.

6.4.4.3. It is critical that all access points to raw milk on the tanker be completely sealed to prevent leaking whether CIP is conducted or not.

6.4.4.4 The truck-mounted transfer hose should be cleaned internally and externally using the CIP or COP equipment at the plant prior to placing it in the cleaned storage compartment.

- If the plant does not have CIP or COP capabilities, the interior and exterior surfaces of the hose should be rinsed with potable water until the discharge running into the drain is clean and clear

6.4.4.5 Once the tanker is unloaded and has no visible contamination on its exterior or in the storage compartment, it should be eligible for movement to the next location.

- The next location could be an off-site CIP facility or another dairy premises for raw milk pick-up.

7. Cleaning and Disinfecting Vehicles

The virus that causes FMD has been shown to be stable in the environment and in organic material (mud, manure, feed, and bedding). Virus stability increases at lower temperatures and with protection from sunlight. FMD virus is inactivated at pH below 6.5 or above 11. Effective disinfectants for hard, nonporous surfaces only are listed in http://www.cfsph.iastate.edu/pdf-library/FMD-Resources/DisinfectantsForFMDVirus.pdf. Proper cleaning procedures are essential in order for the disinfectant to adequately contact the virus and have time to inactivate it.

7.1 Proper Cleaning Procedures for Vehicles

7.1.1 Wear personal protective equipment

7.1.1.1 Gloves, coveralls, rubber or disposable boots, and goggles and a mask if you are generating splashes (eye protection) or dust (respiratory protection). See section 9.4 for more details.

7.1.2 Soak the most visibly contaminated areas to aid in washing

7.1.2.1 Soak the area with water and a detergent or cleaning agent (soap) starting with the dirtiest area and working toward the cleaner areas.

- This will aid in the removal of organic material on the tires, wheel wells, undercarriage, mud flaps, splash guards, and steps.
- May need to drive the vehicle forward slightly to ensure the tire contact surface is soaked.

7.1.3 Wash

7.1.3.1 Wipe, spray or scrub the area, starting with the dirtiest and working towards the cleaner areas.

- The use of pressure washers can enhance organic matter removal on the tires, wheel wells, undercarriage, mud flaps, splash guards, and steps.
- Ensure that the spray and wash water run-off from the vehicle wash does NOT reach animal holding/housing areas as FMD virus in organic matter could result in animal exposure.
- Washing the dirtier areas may cause splatter onto the cleaner areas; hence starting with the dirtiest areas will allow removal there first and subsequent removal of splatter from the cleaner areas last.
- Field demonstrations on full-sized milk tankers used 50-60 gallons of water, 15-20 gallons of citric acid and took approximately 30 minutes to fully clean and disinfect.

7.1.4 Rinse

7.1.4.1 Remove all detergent/soap residues by applying a low pressure water rinse on all surfaces, starting with the top of the tanker and working down.

7.2 Proper Disinfection Procedures for Vehicles

7.2.1 Read the product label

7.2.1.1 Handle the solution correctly to ensure safety of the handler and effectiveness of the disinfectant.

- Personal protective equipment may be needed to mix up solutions.
- Note the recommended dilutions, water temperature, environmental temperature, and the need for ventilation when using the product.

7.2.2 Disinfect

7.2.2.1 Apply the product to the cleaned areas of the vehicle, starting with the tires to maximize contact time before moving.

- Vehicle can be slowly rolled forward to allow the disinfectant to contact all parts of the tires.

7.2.2.2 Allow the product adequate wet contact time (per label directions) with all surfaces to inactivate the virus. Solution must remain 'wet' to actively work; reapplication may be necessary.

9. Personal Protective Equipment (PPE)

PPE is one of many tools that can be implemented to decrease the risk of spreading FMD virus between animals and locations by human activities. Wherever possible, best practices should be implemented to further limit virus spread. PPE is designed to prevent spillage onto, and contamination of skin, street clothing and boots by materials (raw milk, manure, and mud) that could contain FMD virus. The type of PPE that will be worn is determined by the activities performed by personnel at C&D stations and involved in raw milk transfer.

9.1 Importance of PPE during an FMD Outbreak

- Personnel that need to wear PPE during an FMD outbreak will benefit from pre-event education, training, and practice to increase their competencies and most effectively limit virus spread. Topics to cover include:
  - Proper donning
  - Performing tasks while wearing PPE
  - Precautions while wearing PPE for long periods of time

    - Doffing to limit contamination of street clothes
    - Proper disposal of PPE
- Personnel involved in cleaning and disinfecting (C&D) vehicles need to protect their street clothing and footwear from virus contamination during the cleaning process and their exposed skin, eyes, nose, and mouth from the disinfectant.
- Dairy processing plant personnel involved in raw milk transfer should change their clothing and footwear before leaving the plant.
- Protective clothing, uniforms, etc. worn while transferring raw milk should be laundered at the processing plant.
    - If on-site laundering is not possible, clothing that leaves the plant should not be around susceptible animals.

9.4 PPE for Personnel Involved in Raw Milk Handling at the Dairy Processing Plant

Dairy processing plant personnel need to ensure the clothing/footwear worn while handling raw milk does not leave the plant. This can be accomplished by plant-dedicated clothing and footwear or wearing PPE while at the dairy processing plant and leaving it there.

If the milk hauler is responsible for off-loading milk, protective gear should be worn. Follow donning and doffing protocols provided in sections 9.2.2 and 9.2.3.

9.4.1 PPE Supplies for Raw Milk Handling at the Dairy Processing Plant

- Gloves
    - Disposable or waterproof to withstand washing and disinfection while being worn
    - At least 2 pair for every tanker off-load at the processing plant
- Plant dedicated clothing – OR –
- Protective outerwear
    - Disposable or waterproof to withstand washing and disinfection while being worn
    - Cover exposed street clothing
- Plant dedicated footwear – OR –
- Protective footwear
    - Disposable or waterproof to withstand washing and disinfection while being worn
    - They should cover the shoes and socks
- Designated disposal bin for used PPE

9.4 PPE for Personnel Involved in Raw Milk Handling at the Dairy Processing Plant

Dairy processing plant personnel need to ensure the clothing/footwear worn while handling raw milk does not leave the plant. This can be accomplished by plant-dedicated clothing and footwear or wearing PPE while at the dairy processing plant and leaving it there.

If the milk hauler is responsible for off-loading milk, protective gear should be worn. Follow donning and doffing protocols provided in sections 9.2.2 and 9.2.3.

9.2.2 Donning PPE for Haulers/Drivers that Exit the Cab

9.2.2.1 The cab door should be considered a "Vehicle Door Boundary" between the cab and potentially contaminated outside areas.

- Put on single use disposable gloves
- BEST PRACTICE: Put on protective outerwear, at least to the waist if wearing full coveralls (unless farm supplies apron, rain coat)
- Put on protective footwear
    - If disposable outwear is worn, the pant legs of the protective outerwear should be tucked into the protective footwear.

    - If waterproof outerwear is worn, the pant legs should go over the boots, but not touch the ground. This will allow water and disinfectant to remain on the outside of the protective footwear.
- BEST PRACTICE: Step out of the cab and pull the outerwear on the rest of the way then zip closed

9.2.3 Doffing PPE for Haulers/Drivers that Exit the Cab

9.2.3.1 The cab door should be considered a "Vehicle Door Boundary" between the cab and potentially contaminated outside areas.

- If worn, remove farm-dedicated apron or rain coat after disconnecting and storing transfer hose
    - Return to storage area in milk house
- Remove outerwear unless waterproof*
- Remove gloves
- Remove protective footwear unless waterproof**
- Disposable outerwear, gloves, and footwear should be disposed of in a manner that does not contaminate personnel, equipment, or expose susceptible animals
- Get immediately into the cab trying not to introduce any visible contamination on your street shoes or clothing
- *Waterproof protective outerwear that travels with hauler:
    - Put on protective eyewear to prevent splashing disinfectant into eyes upon decontamination
    - Spray approved disinfectant from top to bottom so that it contacts all potentially contaminated surfaces of the outerwear, gloves, and footwear
    - Ensure the disinfectant meets the recommended wet contact time
        - Reapply if the disinfectant dries before the contact time is achieved
    - Remove protective eyewear and disinfect any surfaces that contacted raw milk
        - Store in tanker cab
    - Remove gloves and dispose of on the dairy premises in an appropriate manner.
    - Outerwear and footwear may remain on the milk hauler or be removed and stored in the cab
- **Waterproof protective footwear should be cleaned and disinfected before removal and stored so that it does not contaminate the cab of the truck

9.4.1 PPE Supplies for Raw Milk Handling at the Dairy Processing Plant

- Gloves
    - Disposable or waterproof to withstand washing and disinfection while being worn
    - At least 2 pair for every tanker off-load at the processing plant
- Plant dedicated clothing – OR –
- Protective outerwear
    - Disposable or waterproof to withstand washing and disinfection while being worn
    - Cover exposed street clothing
- Plant dedicated footwear – OR –
- Protective footwear
    - Disposable or waterproof to withstand washing and disinfection while being worn
    - They should cover the shoes and socks
- Designated disposal bin for used PPE

9.6 Proper Disposal of PPE

9.6.1 PPE generated during an FMD outbreak: the performance standard is to dispose or launder PPE in a manner that does not expose susceptible species to FMD virus or contaminate people, vehicles, equipment, and supplies.

- Pre-event, estimate the amount of PPE that will be generated in a given time frame (daily, weekly) so that a disposal or laundering plan can be implemented to accommodate the volume of PPE used.
- A clearly marked receptacle should be provided on farm or at the processing plant so all personnel know where to dispose of their used PPE.
    - Ensure the receptacle is protected from wind and scavengers to prevent the contaminated PPE from leaving the premises. A sealable or latchable lid is advised.
    - A removable liner is advised for ease of removal and containment when transporting to its final destination.
- Burial, burning or landfilling are likely methods for disposal. Ensure the method selected is in accordance with state, local and municipal regulations.

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Comments or Questions

Please send comments or questions to: smsinfo@iastate.edu

Additional Resources

The Secure Milk Supply website has additional resources available at: www.securemilksupply.org

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