

BOAH, INDIANA
BULK MILK HAULER / SAMPLER
GENERAL INFORMATION / STUDY GUIDE

The bulk milk hauler/sampler has a unique and important role in the dairy industry. The hauler/sampler is one of the most important links between the milk producer and the milk processor. The Board of Animal Health—Dairy Division recognizes the great responsibility that is involved while being this crucial link. The judgment and actions of the hauler/sampler have a direct impact on the quality of milk that ultimately reaches the consumer. Dairy processors depend on the hauler/sampler's knowledge for quality milk. Therefore, it is important to use proper techniques and procedures to prevent contamination of the milk while grading, measuring, sampling, and pumping. This will also ensure that producers are paid for the exact amount of milk they produce, while processors pay for the exact amount they receive. The ability to operate a bulk milk tank truck, along with the following list of skills, will ultimately help you become a successful bulk milk hauler/sampler:

You should professionally represent the food industry through personal cleanliness and well mannered communication. This includes using proper sanitation procedures, practicing good hygiene, as well as maintaining your vehicle in a satisfactory condition.

You are the judge of acceptable milk quality and objectively evaluate the milk, before it leaves the farm. Always take the time to observe and smell the milk, before taking and recording the temperature. The quality of milk delivered to the plant depends on how well the hauler identifies and eliminates all unsatisfactory milk before it is pumped onto the tank truck. The hauler/sampler determines which milk will reach the dairy processor and ultimately the consumer.

Accurately determine and record the weight of the milk in the farm bulk tank.

Properly collect, identify and care for the official representative milk sample, to be submitted for laboratory analysis. A true sample must be obtained, so that quality and composition tests will accurately represent the contents of the farm bulk tank. If proper procedures are not followed and a mistake in evaluation occurs, the milk may be improperly accepted or rejected. This may result in unsafe or poor quality milk reaching the consumer, or the loss of money for either the producer or processor.

Requirements for Obtaining an Indiana Bulk Milk Hauler/Sampler Permit

A prospective bulk milk hauler/sampler must:

- Submit a permit application to the State of Indiana, Board of Animal Health, Dairy Division, before working as a bulk milk hauler/sampler.
- Obtain on the job training: This training includes traveling with a competent, permitted individual, to observe the entire sampling process and learn the routes. Bulk Milk Hauler **MAY NOT** pick up milk without a licensed hauler until approved by the state.
- Read and understand this material to prepare for the Indiana written examination and inspection
- Review training material and short training presentation with inspector.
- Pass a written examination, which consists of questions related to the duties of the hauler/sampler.
- Complete a field inspection, which includes a Dairy Division representative's observation of the applicant's milk sampling techniques.
- After satisfactory completion of the training, test and inspection a new hauler will be issued a temporary permit. The hauler will be issued a full permit after attendance to a Bulk Hauler Training Class at BOAH (within 4 months of approval).

Important Points to Remember:

- The permit is valid for two (2) years, and must be renewed upon expiration. A new permit will be issued, if the individual meets all requirements.
- The field inspection is valid for two (2) years from the date of the last field evaluation.
- If the permit or the field evaluation is not renewed before the permit expiration date, the individual may be required to retake the examination prior to permit renewal. Picking up milk with an expired permit is a violation of Indiana State Law therefore; any person picking up milk without a valid permit is subject to enforcement action.

Field Inspection of Bulk Milk Hauler/Sampler

Personal Appearance and Hygiene:

- Bulk milk hauler/samplers are considered food handlers, and should therefore practice good hygiene, maintain a neat and clean appearance, and refrain from tobacco use in the milk house.
- Always use the hand sink to wash hands and wrists thoroughly with soap and warm running water, for at least 30 seconds.
- Keep hands clean and dry throughout the entire weighing and sampling procedure.
- A milk hauler must be free of any communicable diseases or infected sores on hands or arms.
- Dry hands with a clean paper towel.
- Do not use the same paper towel to dry hands and wipe the measuring stick.
- Do not wash hands in the utensil or 2 compartment sink.

Equipment Checklist Prior to Starting Route:

- Hauler/samples should thoroughly examine their truck, equipment and supplies at the beginning of each day. The following are required in order to perform proper sampling and weighing procedures:
- Tank Truck and transfer equipment that have been properly washed and sanitized. The most recent wash tag with the wash time and location where the truck was washed must be attached.
- Sample bottles, sterile bags or tubes that are free from cracks, have a leak, proof lid, and are made of food grade material may be used. The sample containers must be protected from dust, dirt and splash. They may be stored in a clean container with a lid or in a clean plastic bag that is tied at the top. Do not carry bottles in pockets.
- Sample Case that is large enough to hold all samples collected, along with an ample supply of ice. The sample case must be of rigid construction, clean, in good repair, and insulated to maintain sample temperature between 32°F and 40°F. Sample racks (flotation racks), must be provided to prevent the sample bottle lids from being submerged in the water/ice mixture. This will help to protect the samples from possible contamination.
- Sample dipper or other sampling device: of sanitary design carried on the milk tank truck, clean, in good repair and of proper construction (i.e. free of pits, cracks and breaks) stored in the sampling instrument container, with an approved sanitizing solution of the proper strength or sanitized for at least one (1) minute before use.
- Sanitizing agent and sample dipper container of approved construction (i.e. stainless steel), in good repair (smooth nonporous and cleanable surface, no pits or cracks; top/bottom rubber stopper in good condition), and kept clean, freshly prepared sanitizing solution.
- Sanitizer test kit: An applicable test kit for checking sanitizer strength (100 ppm chlorine, 25 ppm iodine, or equivalent), must be carried on the truck at all times. The test kit must match the sanitizing solution used in the sample dipper storage container.
- Calibrated pocket thermometer:
 - An approved type, (metal stem or digital thermometer) with a range of 25-125°F is recommended.
 - Check accuracy at least once every six (6) months against a thermometer certified by NIST (accuracy must be $\pm 2^\circ\text{F}$). A NIST traceable thermometer can be used to calibrate hauler/sampler stem thermometers. The date the thermometer was checked and the initials of the individual who checked it must be recorded by one the following methods:
 - Attach to the thermometer
 - Attach to the thermometer case; or
 - Provide accompanying paperwork.

- ✓ To calibrate the thermometer, place the thermometer stem 24 inches in a mixture of 3 parts ice, 1 part water; agitate the thermometer stem in the ice water. When the dial comes to rest, it should register 32°F. If it does not read 32°F, adjust the calibration screw until it reads 32°F, then calibrate again.
- Watch or other timing device to monitor tank agitation time.
- Waterproof permanent marker to label and identify samples.
- Spray bottle containing sanitizing solution to sanitize the bulk tank outlet valve.

Preparation:

- Verify that the tanker is clean and sanitized, and that the current wash tag is present. Prior to delivering the milk to a processing facility, check tank seals to be sure that none are broken.
- Review the equipment checklist.
- Upon arrival at the farm, transfer milk sampling equipment from the truck to the milk house; turn on lights.
- Bring the transfer hose into the milk house through the hose port. Remove the cap from the bulk tank outlet valve. Before connecting the transfer hose the outlet port shall be sanitized. If milk has leaked past the core of the outlet valve it shall be washed and sanitized. (See attached Indiana code 345 IAC 8-2-3.5 Milk Transportation)
- Remove the cap from the transfer hose, while preventing contamination of the hose cap, and connect the hose to the tank outlet.
- Wash hands properly before grading the milk.

Grade Milk Quality:

Milk must be graded by temperature, odor, and appearance before it can be accepted.

- Temperature: While the milk is agitating, read the temperature on the bulk tank thermometer, then, sanitize the hauler/sampler thermometer in sanitizing solution for at least 60 seconds, and check the temperature of the milk. Always record the temperature, time, date and hauler's full name and hauler/sampler permit number on the milk pickup ticket and temperature control (if it is the first sample). The temperature of the milk should be between 32-45°F.
- Four rules to remember:
 - 1) Milk must be cooled to 50°F or less within 4 hours of the start of the initial milking.
 - 2) Milk must be cooled to 45°F or less, within 2 hours after the completion of every milking.
 - 3) The product blend temperature after the first milking and all subsequent milkings cannot exceed 50°F.
 - 4) Milk should never be above 50°F, after the first milking. If the temperature is above 45°F, do not pick up the milk.

- Each month the hauler/sampler must check the accuracy of the bulk tank thermometer against the hauler's calibrated thermometer. Record both the tank and the calibrated thermometer temperatures on the milk pickup ticket and report any problems. If recording thermometers are used, check the chart for temperature abnormalities since the last pickup.
- Odor:
 - Examine the milk for normal odor by smelling the milk through the smallest tank porthole. Do not open the entire lid because the odors will escape into the air and become undetectable. If any off odors are detected, the hauler/sampler must reject the milk, and contact the dairy cooperative and the producer.
- Appearance:
 - Make sure the tank spotlight is on and/or the area is well lit. Lift the entire lid of the tank. Observe the complete undisturbed milk surface for normal appearance and color. Milk should be free from abnormalities, such as off color and signs of churning, freezing or excessive foaming.

Milk Measurements:

- The milk in the farm bulk milk tank must be measured before it is agitated. If the agitator is running, turn it off and wait for the milk to settle. The milk measurement may only be taken after the surface of the milk is completely motionless.
- Carefully insert the measuring stick into the tank, after it has been wiped dry with a clean single service towel. It should be clean, dry and free of fat. Remove the stick and read at once; or attach the sight tube to the outlet valve, and allow the milk to enter the tube slowly. (Take the reading only after the foam has subsided). Repeat this procedure until two (2) identical measurements are taken. Immediately record measurements on the farm weight ticket.

NOTES:

1. Do not contaminate the milk during measurement. Do not reuse the single service towel, or carry towels in pocket, and make sure hands have been washed.
2. Towels used for washing cow udders frequently are impregnated with chemicals. Do not use them to dry measurement sticks.
3. If a milk measurement is exactly one halfway between the marks on the measurement stick, read it to the nearest even number. If it is not exactly halfway between the marks, then it can be read to the nearest number.
4. Multiple tanks: If there is more than one farm bulk milk tank located on a dairy farm, each tank must be separately sampled, measured, and checked for odor and appearance.
5. If the measuring stick for the farm bulk milk tank is stored outside the milk tank. It must be sanitized and completely dry prior to measuring. Do not heat the stick with water.
6. Vernier: Some tanks have a measuring tube on the outside of the milk tank. A slide, called a vernier, is used to determine the measurement of the milk. Slide the vernier

to the center of the meniscus (the highest point of the milk, in the center of the tube), read the line on the scale plate that corresponds with the measuring point. If the measuring point is between lines, use the lines closest to the measuring point. If the measuring point is exactly halfway between two lines, use the nearest even numbered line.

7. The hauler/sampler must verify that the serial number on the measuring stick, the farm bulk milk tank, and the conversion chart are the same.

Universal Sampling Procedures:

For the industry standards to be upheld, the procedures used to collect raw milk samples at the farm must be done the same way each time. The use of the “universal sampling procedures” allows for more validity and faith in the sample results collected by industry personnel. The following milk sampling procedures must be strictly followed:

- Agitate the milk: Proper agitation time cannot be overemphasized. Adequate agitation time is needed for accurate butterfat and quality sample results.
- Current Standard Methods requires 10 minutes of agitation time for tanks sized 1000 gallons or larger.
- If the tank I.D. plate (usually located at the rear of the tank) indicates a different agitation time, use the time found on the plate to agitate the milk.
- While the tank is being agitated, use a waterproof marker to label each sample with:
 - Producer I.D.
 - Date of pickup

For each temperature control sample include:

- Date of pickup
- Time of pickup
- Temperature of milk
- Producer I.D.
- Hauler/sampler permit # or hauler initials

Collect a representative sample or samples from the bulk tank:

1. Remove the dipper or sampling device from the sanitizing solution.
2. Drain sanitizing solution from the dipper (DO NOT RINSE DIPPER IN WATER).
3. Rinse the dipper at least two times in the milk to remove any residual sanitizer and water, which may affect the sample results.
4. With agitator running, open the sample container, being careful not to touch the inside of the container or lid.
5. Extend the dipper into the milk 6-8 inches and transfer the milk into the sample container. Do not hold the container over the milk when filling. Do not fill the sample

container more than $\frac{3}{4}$ full, so that the laboratory can properly agitate the sample. Fill sample container using 2 dips.

6. Properly close the sample container, making sure it is sealed and does not leak. When using whirlpak bags, make sure enough air is trapped inside the bag to properly agitate the sample.
7. Close the lid of the farm bulk milk tank.
8. Immediately place the sample(s) in the sample case in an upright position. Do not bury the top of the sample container in the ice water.
 - **Once the sample has been collected**, the sample dipper must be rinsed free of milk and placed back in the carrying container to maintain sanitation.
 - **At the first farm pick up**, a second sample called a “temperature control,” identified as “T” or “TC,” must be taken. Label this sample with the five items listed above.

NOTE: A sample should be taken of all milk, even if it is rejected or frozen. Any detected abnormalities must be noted.

NOTE: DO NOT open the outlet valve of the farm bulk milk tank, until the milk is measured and sampled.

Pump out Procedures:

- Once the measurement and sampling procedures are completed and with the agitator still running, open the outlet valve and start the pump. Turn off the agitator when the level of milk reaches the agitator.
- When the milk has been removed from the tank, disconnect the hose from the outlet valve and cap the hose.
- Observe the inside surfaces of the bulk milk tank for sediment or foreign matter and record any observations on the farm weight ticket.
- With the outlet valve open, thoroughly rinse the entire inside surface of the tank with warm water (not hot). Never rinse the tank while the hose is still attached.

Completing the Pickup:

- Complete all record keeping, including the milk pickup ticket, and leave the milk house in good condition.

Milk outside the Tank

Do not pick up any milk that is held outside the producer’s bulk tank. This includes milk stored in pails, milking machines, plastic barrels, trash cans etc. This milk is not refrigerated and may be very high in bacteria or may contain antibiotics or other contaminants.

Pickup Frequency

Milk from Grade A farms must be picked up at least every 48 hours. The bulk tank must be completely emptied at least every 48 hours and cleaned. Manufactured Grade milk must be picked up at least every 72 hours.

Tank Level

If the milk in a producer's tank is not touching the agitator, leave the milk and notify the field person and/or the BOAH inspector for that area. Milk that is not agitated cannot be cooled or sampled properly.

Partial Pickups

Always attempt to pick up all the milk in the producer's bulk tank. Partial pickups are allowed only if the balance of the milk is picked up prior to the next milking. If the tank is not completely emptied, the producer cannot wash the farm tank thus increasing the possibility of a rejected load. All efforts must be made not to use a farm that is conveniently located as a routine top-off point for multiple tankers before completely emptying the tank.

APPEARANCE AND ODOR

- The decision to accept or reject milk is one of the most difficult decisions that must be made. However, this decision is important because poor quality milk from a single milk producer can spoil the quality and flavor of the entire truckload. If the quality of a producer's milk is suspected of being unacceptable, the milk inside the farm bulk milk tank must be rejected. When this occurs, the hauler/sampler is responsible for informing the milk producer and dairy cooperative representative.

1. Appearance

Normally, milk is odorless, mildly sweet in taste, and ranges in color from bluish white to golden yellow. A change in this normal odor or color may result from bacterial growth caused by improper cooling, improper handling practices, or unhealthy cows. When checking the appearance of milk in a farm bulk milk tank, make sure that the tank inspection light is on, or the area above the tank opening has a sufficient amount of light. Lift the lid and observe the entire surface of the milk in the tank. It should be quiescent (still). To aid in making the decision about whether to accept or reject the milk, the hauler/sampler should be familiar with the following problems:

- a. **Bloody milk:** Milk and colostrums from animals having mastitis may contain blood. A small amount of bloody milk can give a large quantity of normal milk a reddish color.
- b. **Flaky milk:** Flakes or curd particles in milk may occur as a result of mastitis, souring, or destabilized protein. Milk from mastitic animals

may show light flakiness or stringy curd particles. Flakiness due to the souring of milk is usually accompanied by a sour milk odor.

- c. Foreign matter: Floating extraneous matter, such as insects, hair, chaff, or straw, is cause for rejecting milk at a farm. The presence of extraneous matter in the milk may be the result of careless handling, improper filtering, opened doors, torn window screens, dusty/dirty conditions, and improper cleaning of the udder, prior to milking. Foreign matter can best be seen once the milk has settled for a few minutes.
- d. Churned milk / Butterballs: Visible fat globules may either stick to the side of the farm bulk milk tank or float in the milk. Butterballs are caused by excessive agitation at warm temperatures, either within the farm bulk milk tank or the milk transfer system.
- e. Frozen milk: The presence of ice in the milk is an indication that the farm bulk milk tank is malfunctioning, and is cooling the milk to below freezing (32°F). The ice will either be floating on top of the milk, or freeze to the sides or bottom of the farm bulk milk tank. Milk that has been frozen may impact the results of laboratory tests.
- f. Excessive foaming: The presence of foam in the farm bulk milk tank may be a result of the agitator running too fast, a short fill pipe or air leak in the milk line during milking, or a rancidity problem. Foam is high in fat, and could affect the proper determination of butterfat in milk when tested.
- g. Curdled milk: Milk that has soured and appears to clump together is considered “curdled.” Curdled milk may have a high bacteria count, and may cause erroneous butterfat and somatic cell results.

2. Odor

An important factor in consumer acceptance of dairy products is flavor. Milk flavor control must begin at the dairy farm. It is important that the milk is not tasted for off flavors, because of the potential health risk associated with raw milk. Off flavors in raw milk invariably show up as off odors as well.

Therefore, if off odors are present with milk, off flavors are also likely to be present. “Normal” milk has virtually no odor. It is important to know what constitutes “normal milk,” so that the milk that is collected can be judged with confidence. If the milk has a serious off odor or appearance problem, it must be rejected. The dairy cooperative representative should be contacted immediately, so that the cause can be determined and corrected. In the event that the hauler/sampler is uncertain about whether a tank load of milk is acceptable, contact the dairy cooperative representative for guidance, and obtain a milk sample from which a final decision can be made. If unsure about detecting an odor in milk, heat a sample of the milk to approximately 100°F for 2-3 minutes, in a closed bottle (use hot water provided at the sink in the milk house). By increasing the temperature of the milk, any odor that is

present will intensify and become easier to detect after the lid of the bottle is opened.

- **Some common off odors and their possible causes are:**
 - a. **Feed:** The feed an animal eats may impart a certain odor to the milk. Some feeds will carry through to the milk more noticeably than others. Odors resembling grass, silage, turnips, and alfalfa hay are outstanding examples. Feed odor can be minimized or eliminated by taking the animals off offending feeds at least four (4) hours before milking. It is possible to detect certain feeds in milk if they are fed to the animal 15-30 minutes before milking.
 - b. **Barnlike:** This odor is caused when animals inhale foul air due to poor barn sanitation and/or ventilation. Proper ventilation, good sanitation, and proper milking procedures will help to correct this problem.
 - c. **Foreign:** Any objectionable odor, that may be considered “foreign” to milk, such as sanitizers, fly spray, paint, oil, kerosene, creosote, or any medicinal substance that would render the milk acceptable or unfit for use. Such an odor may be caused by either direct contamination of the milk, or the absorption of airborne contaminants within the vicinity of the area used for milk storage. NOTE: If sanitizers are left on dairy equipment, they may be absorbed by the milk and impart a foreign odor. Phenolic compounds used in udder ointment may combine with these sanitizers to form highly objectionable foreign odors, which are detectable at very low concentrations.
 - d. **Garlic/Onion:** This obnoxious odor, imparted to the milk when an animal eats garlic, onions, or leeks, is not classified as one of the usual feed flavors described above. The garlic/onion flavor is recognized by the distinctive odor suggestive of its name. It may actually be so objectionable as to render the milk unfit for use.
 - e. **Musty:** This odor is suggestive of musty or moldy hay. It may be absorbed directly by the milk, but it is more likely to originate from feed or stagnant water consumed by an animal.
 - f. **Rancid:** Rancidity may be detected by flavor, but it is not detectable by appearance, so problems such as butterballs or other visual changes are not likely to indicate that milk is rancid. Two types of rancidity occur in milk:
 1. **Oxidative Rancidity:** Oxidized milk gives off odors usually described as cardboard like, metallic, or tallow. These odors are usually more noticeable during the winter months, when animals are consuming dry feed. The most frequent cause of oxidative rancidity is the contamination of milk, by small amounts of copper or iron, from milk contact surfaces.
 2. **Hydrolytic Rancidity:** Hydrolytic rancidity in milk will give off an odor resembling spoiled nuts. This odor is more noticeable during the winter, when animals are on dry feed, or during late lactation. Agitation of warm

raw milk in the presence of air will cause foaming, which will result in a rancid type odor after a few hours.

- g.** Sour: Sour milk will have a malty odor, which can be found when milk is improperly cooled, resulting in increased bacterial growth. Bacterial growth due to unsanitary milking practices and/or unsanitary equipment may also cause milk to sour. Good sanitary practices and prompt cooling in the farm milk tank will help prevent this problem.
- h.** Weedy: The weed like odor is not usually included with the other feed odors. It may include odors that resemble plants such as ragweed, bitter weed, or peppergrass, all of which may negatively affect the flavor of milk. This odor can be eliminated or minimized by keeping animals away from weed infested pastures, and by not offering feed containing such weeds until after the animal has been milked.

CHECKING FOR ODORS:

- Since the hauler/sampler is unable to taste the milk, one must depend on the detection of off odors that would indicate off flavors. Milk odors will usually gather just below the cover of the farm bulk milk tank.

To properly check for off odors:

- Open a small portion of the tank opening, position your nose close to the opening and smell the milk. Do not open the entire lid, as this will allow the off odors to escape into the milk house.
- Inhale 2 or 3 times to determine any abnormal odor. Normal milk has virtually no odor.
- If any off odors are detected, contact the producer, dairy cooperative, and/or the receiving plant.
- Any change in quality should be brought to the attention of the producer either verbally or by recording it on the milk pickup ticket. The detection of off odors can be affected by a number of external factors. The bulk milk hauler/sampler should strive to eliminate each of these factors:
 - Milk house odors
 - Gasoline fumes adhering to clothing
 - Smoking immediately prior to checking for odors and/or smoking in the milk house
 - Eating or chewing aromatic candy, tobacco, medicine, beverages, foods, etc.
 - Use of strongly scented shaving lotion, soap, or other toiletries

PROCEDURES FOR IN-LINE SAMPLERS AND SUB SAMPLING

****YOU MUST BE PERMITTED SPECIFICALLY FOR IN-LINE SAMPLING IN ADDITION TO ROUTINE BULK MILK SAMPLING.****

- 1) Wash your hands
- 2) Obtain sterile, smaller sample vials to be used for sub-sampling.
- 3) Each sub-sample vial shall be identified with:
 - a. Date
 - b. Time (time of sample split)
 - c. Producer Permit Number
 - d. Regulatory agency tanker identification number
 - e. Sample temperature
 - f. Hauler/sampler identification (initials, ID number or name)
- 4) A temperature control (TC) sample is required and it shall be identified with:
 - a. TC
 - b. Date
 - c. Time (time of sample split)
 - d. Producer Permit Number
 - e. Regulatory agency tanker identification number
 - f. Sample temperature
 - g. Hauler/sampler identification (initials, ID number or name)
- 5) Remove the sample container from the in-line sampler or sample storage refrigerator.
- 6) Observe sample for off odors, visual defects, extraneous material and ice. Cap the sample container if taken from the in-line sampler
- 7) Shake the or rapidly invert the sample container 25 times. If undesirable foam is created, the sample may sit for up to 3 minutes to allow the foam to disperse.
- 8) Transfer a portion of the sample into smaller, sterile vials filling each only $\frac{3}{4}$ full.

- 9) Immediately transfer all sample vials into a rack which fits into a cooler with ice/water mix up to the milk level in the vials or samples can be kept in the sample refrigerator until transported.
- 10) Manually clean and sanitize the sampler/sample bottle connection after each CIP cycle and prior to installing a sample bottle. Disassemble and manually clean and sanitize the sampler body if needed.

FOR IN-LINE SAMPLING - IMPORTANT NOTES

- 1) Keep all sample containers protected from contamination.
- 2) Protect in-line sample container caps from contamination while being stored during sampling. Caps can be stored in 200-ppm chlorine or equivalent.
- 3) Perform sub-sampling on a clean well-lit, impervious work surface of adequate size.
- 4) Clean the in-line sampler per manufacturers instructions.
- 5) Provide a brush to manually clean and sanitize the exterior of the sampler/bottle connection.
- 6) Sample containers must be disconnected during Clean in Place (CIP) pipeline Wash
- 7) Partially filled sample containers may be reconnected after CIP
- 8) Provide and maintain a sanitizer spray bottle for sanitizing tanker connections and in-line sampler connections. Bottle must be properly labeled.
- 9) Provide and use sanitizer test kits or strips (200 ppm chlorine or equivalent)
- 10) Maintain in-line sampler refrigerator and sample storage refrigerator between 0-4.4C (32-40°F)
- 11) Provide thermometers in glycol for each refrigerator and record an AM & PM check of the thermometer on the temperature-recording log. If a recording thermometer is used with each refrigerator, the temperature check can be documented on the recording chart.

Corrections are made by adjusting the temperature-recording chart to match the refrigerator thermometer.

- 12) Provide an indicating and recording thermometer with the temperature probes to be installed as close as possible in the milk line downstream from the cooling device prior to the in-line sampler device. A weekly check of the indicating thermometer against the temperature-recording thermometer must be made and recorded on the temperature-recording chart. Corrections are made by adjusting the temperature-recording chart to match the indicating thermometer.
- 13) Maintain refrigerator temperature log sheets for a minimum of 6 months

FACTORS AFFECTING MILK QUALITY

1. **Bacteria Count:** Bacteria are microscopic one celled organisms, which are found on and in all living animals, soil and water (including ponds and wells). Manure, flies, insects, rodents, dirty and unsanitized utensils and equipment may all be sources of harmful bacteria. Because of the widespread presence of bacteria, contamination of dairy equipment must be avoided. Bacterial growth is much greater at room temperature than at 40°F or less. Storing milk samples in an ice and water mixture immediately after collection will help minimize bacterial growth. The amount and type of bacteria found in a milk sample, is a direct reflection of the sanitary conditions and practices that exist on a dairy farm. Contamination can occur while measuring, sampling, and transferring milk. Improper cooling of milk may be a factor in causing high bacteria counts as well. Therefore, extreme care must be taken by the hauler/sampler to minimize any contamination. Only milk that has been properly cooled should be picked up.
2. **Inhibitors:** Medicine and drugs used to treat lactating animals for various infections may leave a residue in the animal's milk. The presence of antibiotics or other drug residues can cause allergic reactions in some individuals; therefore, tests are run to determine their presence of milk. NOTE: Excess residue from sanitizers used on milk sampling equipment may be detected with these tests. Always rinse the sample dipper at least two times in the milk before the sample is taken.
3. **Sediment:** The presence of sediment indicates unsanitary methods of milking and milk handling practices. Occasionally, a representative from the dairy cooperative may ask the hauler/sampler to perform a sediment test. A screen is used to collect residue or debris at the farm bulk milk tank outlet valve. After the milk has been pumped onto the truck, the screen is checked for the amount and type of residue.
4. **Added water:** Water added to milk, either deliberately or accidentally, is illegal. Laboratory tests are used to determine if water has been added to milk before it is

received at the plant. For this reason, the transfer hose must be disconnected from the farm bulk milk tank before the tanks is rinsed.

5. **Somatic Cells:** Somatic cells are white blood cells that are found in milk. High somatic cell counts in cow milk will indicate that an animal in the herd is experiencing an illness, injury, or is becoming dry. Unless the milk is properly agitated, somatic cells will float to the surface of the milk. To obtain a representative sample, the milk in the tank must be agitated for the correct amount of time.
6. **Improper Sampling Techniques:** Failure to follow proper sampling techniques including insufficient agitation time, improper storage of milk samples in the sample case, and improper sanitization of the milk dipper, may contribute to unreliable sample results. Inaccurate bacterial, somatic cell, and/or butterfat test results, may jeopardize the producer's permit or payment.
7. **Agitation:** Once the milk has been agitated for the correct amount of time, butterfat will begin to rise to the surface of the milk when the tank agitator is turned off. For this reason, the sample must always be taken during agitation.

COMMON SANITIZERS

The sanitizer strengths below require a one minute (60 seconds) contact time to be effective. Use appropriate test strips to determine sanitizer concentration.

- Chlorine 100 ppm
- Quaternary Ammonium Compounds 200 ppm
- Iodine 25 ppm
- Sanitizing Solution from Dairy Plants Acceptable

REQUIRED ITEMS ON MILK PRODUCER PICKUP TICKETS

- Milk Temperature
- Time (include AM or PM)
- Date of Pickup
- Hauler/Sampler identification (include company name)
- Hauler/Sampler's signature (Use full name, initials are not acceptable. Please write legibly)

- Producer name
- Producer patron number
- Number of milkings
- Milk measurement (stick or sight tube reading)
- Milk weight
- Note quality problems, if present

Pickup Chart in Milk House

Make sure you put your permit number, name or initials on chart. Reference your complete information at bottom of chart if necessary. Full name at least once on chart.

Bulk Milk Route Tanks/Trucks

- Bulk tank trucks must be permitted each year.
- Bulk tank trucks must be inspected at least once a year.
- If the truck owner/company is based in Indiana they must carry Indiana permits on the tanks. If they only unload in Indiana but are based in another state they must carry that state's permit. Indiana will recognize the permit as valid as long as the inspection is current (within past 12 months).
- Permits and most recent inspection must be kept on truck at all times.

Regulations/Standards/Guidelines

- Indiana Administrative Code 345
- Pasteurized Milk Ordinance (PMO), 2011 Revision
- The Dairy Practices Council—Guidelines for Farm Bulk Milk Collection Procedures #50
- Standard Methods for the Examination of Dairy Products—Sampling Dairy and Related Products.

These can all be accessed and linked to via our website at www.boah.in.gov under Food Safety/Dairy.

FORMS

- 1) Application for Bulk Milk Hauler / Sampler Permit
 - a. Form can be obtained by calling our office 317-544-2391
 - b. Form can be obtain via our website www.boah.in.gov

- 2) Application for Bulk Route / Truck Permit
 - a. Form can be obtained by calling our office 317-544-2391
 - b. Form can be obtain via our website www.boah.in.gov

- 3) Bulk Hauler / Sampler Permit
 - a. Submit application to BOAH, pass written test, pass inspection.
 - b. Permits expire every 2 years, hauler must renew permit.
 - c. Carry permit with you, maintain thermometer checks on reverse
 - d. Updated inspection dates maintained on reverse if applicable

- 4) Bulk Milk Hauler Inspection form
 - a. Hauler must be inspected not less than once every 2 years.

- 5) Bulk Milk Pick-Up Tanker Truck Inspection
 - a. Tank/truck must be inspected at least once a year
 - b. Tank/truck must have current year permit on truck

- 6) Bulk Milk Tank Tags
 - a. These tags are put on farm bulk tanks when permit is suspend with milk in tank
 - b. Yellow is Suspended from Grade A”
 - c. Pink is Health Hazard-Suspended from Grade A and Mfg. Grade

- 7) Milkhouse Pickup Chart
 - a. Every farm should have a pick up chart similar to this one. All charts vary but will have the same basic information that must be recorded.

- 8) Agitator Running Pick Procedures Flow Chart

- 9) Agitator NOT Running Pick Producers Flow Chart