



On-Farm Milk Disposal Advisory Summary

April 3, 2020

No dairy producer wants to dump milk. The unique situation associated with COVID19 impacting fluid milk distribution routes may result in dairy producers being asked to dump milk. Producers are already taking actions to reduce milk production through management tools: diet modification, early dry off or culling cows. However, fluid supply excesses continue. Each facility operator must carefully weigh options and potential impact to facility infrastructure before dumping milk.

Four basic options exist:

1. Preferentially, use milk for animal feed. Identify a local calf ranch capable of handling milk. If this choice is available and used, you need not track disposal for Water Quality purposes. You will want to track this for your purposes. Your coop or dairy trade associate may be able to help you locate a calf ranch.
2. Load milk into tanker truck and drive it around to the manure storage area. Important considerations include where to insert the milk into the waste stream, avoiding mechanical separators, diluting milk as much as possible with flows from the liquid waste stream. DO NOT insert milk into a digester if your digester biogas receives renewal energy credits. Increased attention to fly and odor control will be necessary.
3. Pump milk from the bulk tank through the milk parlor to enter the waste steam. Be sure to follow any flow of milk with sizeable flushing to move all milk constituents to the ponds. Increased attention to fly and odor control as well as cross-lane slipperiness is essential.
4. Dispose of milk down the drain in the milk house. Avoid this option if the drain flows to a storage cistern. Check your milk house drain pipe size before considering this option. Considerable dilution with fresh water is necessary. There is no easy way to clean drain lines. Concerns of calcium build up in the drain system are credible.

Producers will want to keep a record of dumped milk and track its disposition (see table at end for your use).

Each Regional Water Quality Control Board manages milk disposal differently. In the Central Valley [emergency guidance](#) is available. For Regions 1, 2, and 8 disposal of milk is part of the existing dairy regulatory process.

Lastly, remember your employees! Staff at the dairy invest many hours to ensure animals are provided a comfortable environment, fed regularly and milked with a common routine. Please explain to them why this is happening. Reassure them how important their jobs are at the dairy and how essential their work is.

Background

Fluid milk consumption has dropped as California's [Stay-at-Home Order](#) continues. Some processors will find it necessary not to pick up some loads of milk. Additionally, if disruptions in transportation occur, additional loads may have delays adding to on-farm milk disposal needs.

Management Considerations

Be mindful of social media. It is important to ensure photos are not taken and posted on social media while milk is dumped. This will cause considerable backlash to the industry.

Physical and chemical composition of milk. Bulk tank milk temperatures are between 37 and 42° Fahrenheit. Milk contains fat, protein, lactose and essential nutrients (Table 1). Consider dairy facility infrastructure and ability to fully clean milk contact areas before selecting your option. It is essential to fully relocate milk to its end location. Producers familiar with milk stone in their pipelines are well aware of challenges when milk is not fully removed from surfaces. Struvite forms with equal parts of magnesium, ammonium and phosphate when pH is more basic (increased formation above pH 7). Milk stone (calcium and magnesium phosphates along with protein etc.) is another precipitate that may occur under specific conditions. Both require considerable effort to remove.

Any milk remaining in open-air channels will attract flies and may add to odor concerns. Additionally, this may contribute to slippery surfaces.

Table 1. Average bulk milk composition from thirty-four Central Valley dairies in California.		
Constituent	Value	Unit of measure
Fat	3.62	Percent
Protein	3.15	Percent
Calcium	1011	ppm
Phosphorus	811	ppm
Magnesium	100	ppm
Potassium	1434	ppm
Sodium	377	ppm
Sulfur	271	ppm
Chloride	896	ppm
Iron	.18	ppm
Copper	.05	ppm
Manganese	03	ppm
Zinc	4.22	ppm
Biological Oxygen Demand ¹	140,000	mg O ₂ / liter
Source: Robinson, Beaucaire, Meyer. Milk levels in bulk milk of California dairy cows.		

Relocate milk via tanker truck. Load milk into the tanker truck and drive it to the lagoon. If possible, bypass mechanical or gravity separation systems. Add milk to the lagoon where other waters enter. Time addition to coincide with regular flushing to maximize dilution of milk. Avoid large pulses of milk entering a lagoon that may create fly, odor and other nuisance conditions.

Pump milk from the bulk tank to the back of the sprinkler pen. Follow with considerable flushing to get all milk to the lagoon system and minimize conditions that result in increased flies, odor or slippery concrete.

Slippery lanes. Inspect concrete lanes if milk is sent to the lagoon through the milking parlor. Fat and protein can leave residues that feed bacteria or algae resulting in slippery surfaces.

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Extra flushes. Increase water circulation where milk runs. This will help dilute the milk prior to entering the lagoon as well as move residual milk through the system. Standard lagoon recirculating flush water on dairies can range from 0.7 to 1.7% total solids. The pH of this material is usually between 7.2 and 7.8. Flush water recirculating from a processing pit will have higher solids and higher pH values. Observe transfer lanes post disposal to identify any precipitates or residual solids that may build up. Manage according to farm Standard Operating Procedures.

Avoid gravity separation systems. It is important for milk to mix quickly. Gravity separation systems will slow the mixing of milk. Avoid milk going through gravity separation systems or into areas of ponds with high solids.

Manage your mechanical separator. If possible, have milk bypass mechanical separators. Greater attention to cleaning screens is necessary when milk is included in the waste stream. Consider time of day before dumping milk. Temperature of flush water increases as air temperature increases. You may want to time milk dumping to occur during warmer hours of the day and before regular separator cleaning to minimize adverse impact on separator function.

Agitate. Insert power take off agitator into pond or use a floating agitator to aid in mixing.

Dairy digesters. Consult your digester partner before adding milk into your digester. If you have a digester that is receiving, RIN credits (Renewable Identification Number) for energy credits 100% cow gas is required. The California Low Carbon Fuel Standards use a specific scorecard to evaluate credits. This scorecard does not currently allow inclusion of milk as a substrate for biogas production. Milk likely will need to go into the lagoon system after the digester. If your digester does not utilize energy credits, you may consider inserting milk into the digester. You will want to mix it through dilution to minimize slug feeding of energy dense material into the digester. You will also need to monitor gas production and manage sulfur.

Nutrient composition. The addition of a tanker of milk (5,500 gallons) will add about 270 lbs of nitrogen and 43 lbs of phosphorus. Some percent of this nitrogen will volatilize from the waste stream. Considerations may need to be made to the nutrient management plan depending on the amount of milk dumped.

Keep records. One tanker load of milk is definitely an economic hit. It also relocates part of the nutrients into the waste stream. Track milk disposed. Your Cooperative may do this for you.

Minimize impact to the environment. The [Central Valley guidance](#) identifies the following as appropriate measures.

- Prevent milk from entering surface water through irrigation or storm water drainage systems
- When possible, dilute milk with fresh water when applying it to cropland
- Prevent ponding of waste milk, in the dairy production area or in fields
- If temporarily discharged to a dairy's storage pond, waste milk must not cause the pond to exceed its holding capacity

Notify the Central Valley Water Board within one week of disposal. For producers located in and south of Madera County, submit documentation to Dale.Essary@waterboards.ca.gov. For producers located in and north of Merced County submit documentation to Charlene.Herbst@waterboards.ca.gov.

Dairies in the Central Valley must provide the following information to the Central Valley Regional Water Quality Control Board within 7 days of waste discharge.

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COVID19 Emergency Milk Disposal Occurrence due to processor request
Date of incident
Volume of milk dumped
Where milk was discharged
If milk was discharged to somewhere other than the waste management system include a location on an aerial map.

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