Green flags and warning signs

by CATHERINE BROWN

RON BOWKER, a dairy producer in Prince Edward County near Belleville, has recently experienced a few warnings and alarms on his DairyCheq/Meko Milk Guard time-temperature recorder (TTR).

Most of them showed that the bulk tank wash water wasn't hot enough. He thought he knew the source of his problem. Whenever he did morning chores later than usual, he would wash the lines, as usual, but it was closer to the arrival time of the milk truck driver who starts the tank wash when he's done.

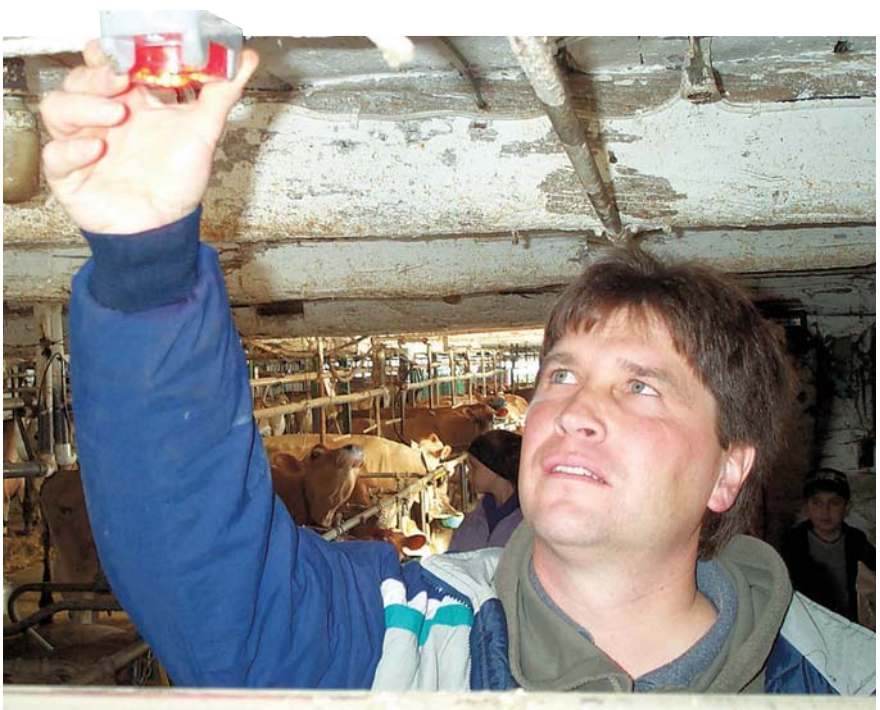
That didn't allow the hot water tank sufficient time to regenerate enough hot water for the job so soon after the pipes were cleaned.

When DFO Farm Systems and Management Specialist Guy Seguin inspected Bowker's TTR, he was able to construct a graph to show Bowker the pattern his wash cycles formed. It was not conforming to a typical pattern. The problem, they discovered together, was that the pre-rinse has been too hot.

At that point, Bowker discovered how to save energy while cutting back his hot water use and to conserve enough hot water for his bulk tank washing.

When Bowker's TTR was first installed 3.5 years ago, it alerted him to the absence of enough hot water the very first day. The problem was a faulty hot water tank element.

More recently, an alarm first thing in the morning alerted Bowker that the pipelines hadn't been washed the night before. An equipment dealer had been there late and shut down the wash in order to install a new pump motor from the jar to the bulk tank. He didn't restart the



Ron Bowker checks out the warning light for his time temperature thermometer

Like the idea or not, about half of Ontario dairy farmers now have time temperature recorders. Here's a guide to what they will and will not do

wash and without the TTR, Bowker might not have realized that.

As chairman of his local milk committee, Bowker was one of 67 producers who participated in one of two DFO pilot projects to evaluate six time-temperature recorders (TTRs) from five companies. He was glad to have opted for the electronic DairyCheq/Meko MilkGuard recorder which was ultimately chosen as DFO's official TTR.

The TTR really hasn't changed anything in Bowker's daily routine on his 65-cow purebred Jersey operation. He simply glances at the recorder as he enters the barn in the morning to ensure nothing has malfunctioned and that everything has been washed and cooled properly.

He says it gives him a lot of reassurance. If there are no red lights, he proceeds as usual. When there is a problem, he's given early notice before the milk is affected.

Bulk milk tank graders (BMTGs) will be able to double check for cooling issues when they're unsure if the smell is off. TTR lights will tell drivers if something is wrong with the tank of milk being picked up.

Solid green means "good". Solid/Flashing Red means there are issues with that tank of milk. And no light means there is no milk in the tank. Graders will also be alble to check a dedicated BMTG menu to check which alarm(s), if any, are related to that tank of milk. Producers will be able to further document cooling patterns to confirm or omit cooling issues when milk quality is questioned.

Until all necessary adjustments are made, hot water wash temperatures might be an issue on cold days. On hot days, high blend temperatures during the second or third milking could be a problem. But that is where the TTR can prove its worth. "It's a tool for everybody," says DFO's Guy Seguin. "It's all about mitigating risk."

The TTR device is capable of preventing most bulk tank losses and penalty-level bacteria counts. One of the biggest risks to milk, according to George MacNaughton, DFO's director of farm policies and programs, is failure to cool it quickly and maintain it at one to four degrees Celsius during storage.

The most common problem with milk that relates to cooling, says MacNaughton, continues to be forgetting to turn the bulk tank on during the first milking. The TTR catches these mistakes before any damage is done.

Bacteria have the potential of doubling every 20 minutes at room temperature.

"Mechanical problems can be outright failures but the majority occur gradually," says MacNaughton. Manual recording has been deemed impractical for most farms and don't give any indication of what occurs between checks.

Those with TTRs have a quality control mechanism in place but more importantly, a device that will document it.

TTRs have been analyzed by DFO since 1998, in conjunction with the development of the Canadian Quality Milk Program.

The recording thermometers are

What a TTR will do:

What the Meko MilkGuard Time-Temperature Recorder (TTR) directly and indirectly monitors:

- bulk tank controls
- condensing unit
- pipeline washer
- bulk tank wash pump
- hot water system
- agitator
- the start and end of every milking
- detergent chemical pumps (optional)
- its own sensors
- power outage
- external device

For more information about the Canadian Quality Milk Program (CQM), see DFO's website at www.milk.org.

More information about DairyCheq/Meko's MilkGuard can be found at www.dairycheq.com.

Training courses on time-temperature recorders are being offered to milk cooling and equipment dealers by Guy Seguin, DFO farm systems and managment specialist, across the province. They resume February 2006 in southwestern and eastern Ontario and are open to anyone that is interested. Contact DFO for more information.

mandatory to monitor bulk tank milk temperatures in the European Union. Since January 2000, they became mandatory on new installations in some U.S. states. Now all Ontario dairy farms will be required to have a working TTR that meets DFO specifications by Jan. 1, 2007.

More than 20,000 Meko MilkGuard TTRs have been installed worldwide. Meko is the largest manufacturer, installer and service provider of bulk tanks in Holland and has been in the cooling business for 22 years. Dairies own all bulk milk coolers on the farms in Holland, so TTRs were regulated by the processors there.

Ontario's producer-driven initiative is therefore unique in the world, according to Seguin. Producers should be proud of this, he says.

About 2,000 units have been installed in Ontario to-date, by DairyCheq, the Ontario-based company partnering with Meko on this project, says Seguin.

"Time-temperature recorders are currently strictly a producer tool," says DFO's George MacNaughton. They will provide information for troubleshooting until 2007, after which full CQM implementation begins.

Bowker, owner of the unit for three and a half years, is happy with it, while still others refuse to install one on their property. It's another tangible cost in the interests of food safety, which falls hard on the shoulders of commodity producers.

While the rollout and installation phase is well underway, the promised subsidies and federal grants totaling $1,050 to $1,150 should reduce the purchase and installation price to about $750. Coupled with an optional payment plan, DFO officials promise the investment to be worth it in saved bulk tank loads, and in the prevention of bacteria and freezing point penalties.

Those shipping grade A milk for years with no high bacteria penalties still find it hard to swallow. The political ramifications have yet to be played out as the deadline for full CQM adoption approaches.

Part of CQM

Other provinces are at various stages of implementing the Canadian Quality Milk Program (CQM), through which producers are required to have a TTR before validation. Some of them have been looking at the TTR information compiled by DFO.

Approved by the Canadian Food Inspection Agency (CFIA) in late 2003, each province has been implementing the CQM program as it sees fit. Monitoring of milk cooling and washing systems is one of four main components to the program, which also covers standard operating procedures, livestock medicines and pesticides management, water testing and livestock transportation.

The DairyCheq/Meko MilkGuard, is a record-keeper, of sorts, storing cooling temperatures every five minutes and wash cycle temperatures every 20 seconds.

A backup battery within the TTR, in case of power outages, is good for up to 10 years. The system checks the battery at least once a month.

The electronic MilkGuard features Bluetooth technology, which will allow DFO to change time or temperature parameters on all TTRs using the handheld computer used by bulk milk tank graders in a period of a few days. It will also let DFO field representatives collect and review information from the TTRs for audit purposes in a matter of minutes.

DFO decided to go with a single vendor to supply and install the TTRs throughout Ontario during the initial

roll-out period, in order to take advantage of volume discounts and post-installation servicing as well as maximize the cost benefits of systematic installation. The decision also makes producer and DFO staff training easier and communications more efficient.

Bowker is confident that DFO is ahead of the curve in its decision to make CQM and the TTRs mandatory. He's sure that government would have eventually enforced similar safeguards in the system and he's glad that DFO took the initiative early, in order to make informed choices over the space of a few years. He thinks any remaining grumblings about the change will die down significantly once the units are installed.

A perennial concern is that old bulk tanks will have to be replaced by new ones in order to cool to the required standards. Another is that plate coolers might be necessary in order to avoid regulatory alarms for high blend temperatures.

Seguin says that few, if any tanks might have to be replaced. More probably, some cooling systems will have to be upgraded, he says, especially in cases where producers have increased their number of milking units without increasing the cooling capacity of their tanks.

The MilkGuard is equipped with an approved am/pm DHI clock, equivalent to the Nasco clock, storing all milking start/stop times for the last 18 milkings. Not only does this allow producers to check the consistency of milking times, it allows them to

subscribe to am/pm testing.

The TTRs are not expected to change previous routines with DHI, however, according to DHI's Richard Cantin.

The role of auditors

The TTR will, however, give DFO field service representatives (FSRs) a snapshot of cooling, agitation and wash issues with the farm being evaluated. Up to two years of data relating to regulatory alarms can be downloaded for auditing purposes and possibly for investigation purposes.

Whereas auditing is conducted by independent certified consultants in other provinces, DFO takes on that role as part of its administrative agreement with the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), in which it takes responsibility for inspection. This adds the hat of CQM auditor to field service reps.

"What really varies from the inspection-based program to the one that's in the CQM is the record-keeping side of it," says MacNaughton. Nine additional inspection points were added to the traditional inspection forms to accommodate CQM audits.

"Ontario is currently the only province responsible for its own inspections, so it makes sense for us to roll that in," says MacNaughton.

When DFO does eventually audit, it will take note of regulatory alarms but also of the producer's recorded proof that he has taken corrective action. Only in the event of multiple alarms, in which no corrective action is taken, will sanctions likely be taken, according to MacNaughton.

It is anticipated that the TTR audits will be built into the current two-year inspection cycle. But that being said, separate inspection programs for the CQM program, such as those in other provinces, are still being discussed.

On a day-to-day basis, producer alarms give the first level of warning, before regulatory alarms are permanently noted. A buzzer and flashing green light on the TTR means "warning", whereas a red light and buzzer means there is a regulatory issue.

Cooling issues include slow cooling, high blend temperatures or bulk tank temperatures that are too low. The frequency or absence of agitation is also monitored.

When the vacuum sensor determines that milking has begun, producer warnings occur if no milk is detected by a predetermined time. In other words, it might remind producers of an open valve, saving milk from going down the drain.

Other warnings involving cooling give producers an idea if projected temperatures are high. In other words, 10 minutes after milking, a producer could get a warning to show that the projected temperature of milk would not be under five degrees within the required one hour after milking. This would give him/her a head start to check the cooling system for problems.

Producers can make adjustments to their own parameters or default settings, except in the case of regulatory issues. Bowker, for example, decided to delay the warning that no milk is detected in the tank, in order to avoid warnings when the time between vacuum activation and milking is longer, for whatever reason.

The tank wash temperature, however, is not negotiable. DFO regulations say a 40-degree wash must be sustained for four minutes. A 0.5 to one degree margin of error is accounted for in warnings and alarms concerning temperature recordings.

The light indicator producer warning also shows whether the blend temperature is greater than 50 degrees Fahrenheit or 10 degrees Celsius. Bowker's light sensor is located on the ceiling inside his tie-stall barn, where it is visible when he is milking.

Blend temperature challenges might be avoided if agitation is started early at each milking. If too many milking units and insufficient cooling power is the issue, a plate cooler would be a definite benefit, says Seguin. Otherwise, there is one more tip he can offer.

Milk has to be stored between 1C and 4C. Blended milk must reach the required temperature within one hour and should never be over 10C. If the milk in the tank sits at close to 4C, it could be further cooled to 1C before the second milking, in order to lower the overall blend temperature. "It's a kick start to cool the milk faster," says Seguin.

Proponents of the TTR monitors are talking about the future of such devices to measure other other barn systems such as automatic feeding, manure handling systems and temperature and ventilation controls, among other things.

Currently, producers can add an optional conductivity sensor for both the pipeline and bulk tank for an additional $360 if installed during the rollout period. This sensor essentially measures the soap quantity in the washes to ensure chemical pumps are adding enough of it. It is not needed if producers fill their own detergent jugs.

The performance of the new TTRs is being studied at the University of Guelph by professor David Kelton and colleagues. Five hundred dairy farms already using the device are being compared to 500 farms awaiting installation in terms of milk quality and practical value.

The relationship between wash water and milk quality will be examined on the same farms. The research team will also survey producers to see if their feelings toward the TTRs change over time.

dairy