Water Waste Reduction in Dairy Manufacturing

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Dairy manufacturing plants are among the heaviest users of municipal water in the United States. Depending on the products they make, dairy manufactures might use as much as *two gallons of water* – every day - *for every single gallon of consumer product they produce.*

The CIP (Clean-In-Place) systems that daily wash and sanitize every truck, tank, pipe, and surface in the plant use – and waste – the greatest amount of that precious water. Much of that water has to be heated. Chemicals must be added. And cities levy charges for the use of their municipal drain systems.

A typical CIP system will push water and chemicals through dairy plant equipment at 100-200 gallons per minute, exceeding the general understanding that water flowing across dairy food processing surfaces at 5-6 feet per second will create the required cleaning action. But for how long must this heavy flow continue to assure complete cleaning?

In process plants where Vigilistics has installed its analysis software we have documented expensive waste of water and chemicals in CIP. This is not surprising because it is quite common that, over time, dairy manufacturers deal with minor quality problems which *could possibly* be CIP-related by increasing the time of each step in their CIP wash and rinse programs. Yet most of this water – and sometimes all of it – makes one pass through the equipment and then goes straight to the wastewater drain. For every one of those extra minutes added to the wash in an attempt to correct quality, 100 to 200 gallons of hot water go down the drain. In cleaning a typical dairy plant, three or four steps of each CIP program run water to drain. Add two extra minutes to each of those steps, then do that 50 times, once for each CIP performed that day, and the loss becomes a major expense in wasted water and chemicals, higher municipal charges, and in energy costs to heat the water to CIP temperatures. And sadly, this extra water time seldom solves the original quality problem.

At one of Vigilistics' dairy manufacturing customers, we were able to guide the plant in reducing their water usage *by over 30,000 gallons a day.* It took us two weeks. We established this savings by critically documenting their CIP operations in real time using Vigilistics **Real-time Operational Intelligence** software to monitor every CIP event, correlated against perceived results and strict quality tests. Supervisors and plant managers used this information to tune their CIP programs to create truly effective cleaning, using no more than the exact amount of water required. To ensure sustained benefits, that Vigilistics software continues to constantly monitor the situation.

Success in another major dairy process plant highlights another benefit of tuning CIP programs using Vigilistics. Not only did this plant save $20,000 a month in water and wastewater charges, but they recovered valuable production time. When equipment is being washed, it is not productive. This plant also used Vigilistics **Real-time Operational Intelligence** software to analyze the performance of each CIP wash, and to reduce step times to create optimum performance. They saved an average of ten minutes on each piece of equipment being washed. Since each CIP circuit washed about ten different pieces of equipment, about an hour and a half of production time per day was recovered. That recovery equates to a 6.25% increase in equipment productivity with no increase in fixed costs.

Sending wastewater to the drain is a required component of dairy manufacturing. Vigilistics has now made it possible to manage and limit the cost of that drain through documented savings in water, in chemicals, in heat, and in production time. That's all bad for the drain, good for the bottom line.

Craig Nelson *has been teaching within the FDA and US Public Health Service for over twelve years. He is recognized as an expert on federal regulatory affairs and on regulatory impact on dairy and food manufacturing automation. He was an author on the 2005 PMO (Pasteurized Milk Ordinance) "Criteria for the Evaluation of Computerized Systems for Grade 'A' Public Health Controls." Craig addresses and teaches regularly across the US for the FDA and its ratings officers.*

Craig is Founder and Chief Technology Officer of Vigilistics, Inc. *a provider of software for dairy and food plant tracking, Bioterrorism Act compliance, and production improvement information.*