

# TRIANGULAR WAVE

## Case Study No. 102

### Triangular Wave System Protects Kessler's Meat Processing Plant from Deposits and Corrosion

**Kessler's Inc.** produces a variety of meat products for distribution in 14 Eastern states. For over 80 years the company has produced quality products and remained competitive in the marketplace. Efficiency in plant operations and cost control for Kessler's, as with any corporations, are top priorities.

In 1996, Kessler's maintenance personnel knew they had a major water problem that was affecting the firm's operations. **Their water source into their plant was so high in TDS that their 1.5 inch water pipe was 30% clogged with scale.** The open pipe flow was 60 gpm, while the clogged pipe gpm was 20 gpm, and cleaning and chemical treatment only had temporary benefits. In addition, deposit formations and corrosion were causing problems in their boiler, cooling tower, compressors, and their meat processing equipment.



evaluated the system and its working principle thoroughly with our engineering and consulting sources", said Byrem.

The Phase 5 (Triangular Wave) System was installed in May 1997.

After about four weeks, the first signs of a change became noticeable to Dave Eynon, who notified Ed Byrem. "We found scale in the holding tank for our cooling tower, which told us that the **cooling tower must be losing some of its scale.** I asked Dave if this was the result of chemical treatment of the tower and Dave informed me that he had eliminated all chemical treatment of our water systems when the Triangular Wave System was installed".

Over the next several weeks and months, many positive changes in the plant's systems and costs began to surface.

**First, the original problem of the clogged pipe and restricted water flow was eliminated.** This meant that Kessler's maintenance staff no longer had to spend time cleaning or treating the pipe in order to maintain high efficiency of water delivery to the plant.

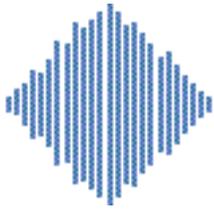
**Second,** the cooling tower and boiler were being treated with chemicals at an annual cost of \$2000.00 per year, and routine cleaning of this equipment was still part of Kessler's maintenance duties. Since installation of the Triangular Wave, the entire chemical expense has been avoided, and the tower and boiler have not needed nearly as much cleaning. In fact, **the firm selling the chemicals to Kessler's admitted to them that they no longer need to purchase the chemicals.**



Technician Inspects Triangular Wave Coil and Power Supply

Ed Byrem, Kessler's Plant Manager, Glen Sansom, Asst. Plant Manager and Dave Eynon, Maintenance Superintendent knew they had to address the problem as it was increasing costs and decreasing plant efficiency. "We looked at **several technologies that could potentially**

**solve the problem and decided to install the Phase 5 (Triangular Wave Technology),** and then monitor it closely. We have always been technically oriented in solving the plant's problems, and we



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**Third**, several process equipment systems also received benefit. The spray nozzles in the ovens, which are used to spray water on the meat to cool it and not allow over-cooking, used to clog every week from deposits.



Cooling tower and water holding tank ( shown here ) Old scale detached from the tower

“We estimated that this process alone, of removing and cleaning spray nozzles required about 200 man-hours each year. In addition, when the nozzles were clogged, our meat quality could be affected without our quick response and monitoring”. Since installation of the Triangular Wave System, **none of the spray nozzles have needed cleaning, and the process is operating as designed**; producing the highest quality meat products with much less down-time.

**Fourth**, the vacuum chamber machine has two “heads” that cool the film used to package the meat products. The heads are aluminum, and the water with the chemicals was pitting the small cooling water passages in the heads. Deposits would also form on the machines decreasing production, and requiring routine cleaning. Since installation of the Triangular Wave System,



Vacuum Chamber Cooling Head

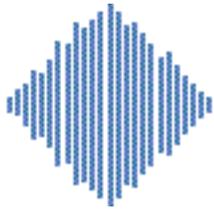
**the corrosion and deposit problem has been eliminated**, allowing full production capacity of the machines.

**Fifth**, Kessler’s had three water softener systems installed to treat the water throughout the facility. The systems required on-going maintenance and upkeep. Kessler’s had been purchasing about 300 pounds of salt each month for the softeners. This required maintenance, personnel time, and monitoring. All three softeners were disconnected after installation of the Triangular Wave System; **eliminating the approximately \$600.00 per year salt costs and the labor and time to service the softeners**.

**Sixth**, Kessler’s experienced a **cost savings they did not expect**. It started as a mystery to Ed Byrem and the management at Kessler’s. “Our controller approached me one day and asked me why our electrical costs had dropped significantly over the past year. At first, we had no explanation as production hours, etc. were the same as the prior year. In evaluating all potential explanations, with the help of our refrigeration and engineering consultants, we determined that our compressors were the difference. **The heads on the compressors**

**were deposit-free and running cooler, which uses much less electricity**. After extensive evaluation of electrical usage, we believe that we have conservatively achieved a 9% savings on total plant electrical use

as a result of the Triangular Wave System and its effect on our compressors,” commented Byrem.



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In sum, the small investment in the Triangular Wave System has reduced Kessler's operational costs and increased quality production at the same time.

### Cost Savings Summary

Operation	Reduced Hours Labor Per Year	Direct Expense Reduction
Water Line "Clog"	46 Hours	
Cooling Tower/ Boiler Maintenance	32 Hours	\$2000,00 ( Chemicals )
Spray Nozzle " Clog"	200 Hours	
Tuber Machine " Clog"	32 Hours	
and Corrosion		
Water Softeners	20 Hours	\$600.00 (Salts)
Electric Use		9% Reduction

The system aided Kessler's in increasing the efficiency of its operations, less down time due to cleaning and maintenance, and higher production of meat products.

Ed Byrem's final comments on Kessler's experience with the Triangular Wave System, "I am not against change, but I wanted to be sure the change we made would provide the expected benefit. But if it proves itself, as this system has, I am willing to say it works. The system is doing what it is supposed to do."