

Potato Chip Manufacturer Reduces Energy Costs with Online Steam Trap Monitoring

RESULTS

- 20.3 month payback annualized
- 205 metric ton reduction in CO₂ annualized
- Steam savings of \$27,810 annualized



APPLICATION

Steam Trap Monitoring

CUSTOMER

North American Chip Manufacturer

CHALLENGE

Steam quality is a critical component in the making of many of the foods and beverages we enjoy. In a recent energy reduction project, a potato chip manufacturer installed three rooftop heat recovery steam generator units that recycle heat from the ovens that toast chips. Heat-recovery boilers convert the exhaust into steam that is used throughout the plant.

To further reduce energy costs, the plant wanted to collect data from each of the three lines and determine the BTUs used per ton of product. Reports would be sent to each of the unit leaders, who would take ownership of the energy costs. The reports would indicate what units were the largest energy users, which were most inefficient (per ton of product) and even which lines were becoming inefficient over time.

Plans to manage steam quality and availability included:

- Improved boiler efficiency
- Maximized return of condensate
- Maintenance of steam heat exchangers
- Insulation of all sections of pipe
- Reduced pressure losses before steam turbine
- Reduced header upsets – venting through PRVs
- Proper maintenance of steam traps

The key to optimize these steam system management methods is data collection and analysis. Unfortunately, the plant did not have timely information for the steam traps. An audit was performed annually for each of the 400 traps, where technicians would compare actual parameters with ideal parameters. This provided only a brief view of the health of the trap.

These analysis required significant man hours, could be inconsistent and inaccurate, and left the plant vulnerable to the impact of failed traps between audits.

Increased manual surveys were not possible because of the man-hours required and the safety considerations. A new, innovative solution was required.

“We identified 12 trap failures in just the first two months. We were able to take action more quickly, and have realized an annualized reduction in CO₂ of 205 metric tons. We estimated an annualized savings of \$27,810, and a payback at 20.3 months.”

Facilities Manager

North American Chip Manufacturer



Steam generator capture gases that would be exhausted and use that heat for boiler systems.

SOLUTION

The Rosemount™708 Wireless Acoustic Transmitter provided the customer with a cost effective way to continuously monitor traps online. Fifty devices were installed on 50 of the highest priority steam traps in the plant, with priority based on:

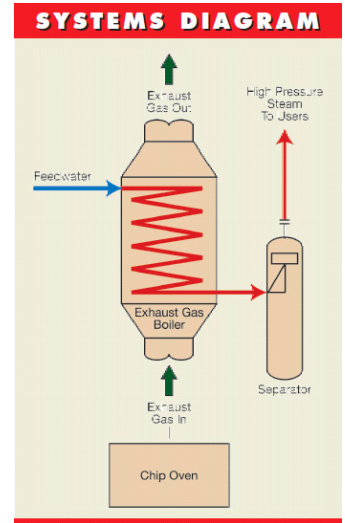
- Capacity (potential loss of energy)
- Process control impact
- Access (difficulty to inspect using conventional methods)

Installation was non-intrusive and easily done using stainless steel bands to clamp each device to the pipe – with no cutting required and no process downtime. “The installation is easy but important,” said the Facilities Manager. “The bulk of our time was spent getting to the traps, since many of them were in hard-to-reach places.” He added a warning, “We discovered that proper installation is crucial; we had to ensure proper pipe contact with each device to prevent false cold readings.”

Once each device was placed properly, the transmitter was “joined” to one of the two Emerson™ Wireless 1420 Gateways, which were wired to a local workstation. Installation was complete once configuration with the software was done. “We had to enter the inlet/outlet pressures, trap style, and whether it was indoors or outdoors,” the manager stated. “Steam trap state is then calculated using PlantWeb Insight software.” This software works with all trap vendors; it applies algorithms to: measured acoustic and temperature measurements; user-provided pressure and trap type inputs. Continuous monitoring of steam traps provides an accurate analysis of trap health and enables plant personnel to replace failed traps before they impact the efficiency of the plant operation or worse, personnel safety. Cost benefits were realized early. “We monitor all of the steam traps on a daily basis,” the Facilities Manager said. “We identified 12 failures in just the first two months. We were able to take action more quickly, and have an annualized reduction in CO₂ of 205 metric tons. We estimated an annualized savings of \$27,810, and a payback estimated at 20.3 months.”

With the savings from the first project, the plant decided to double the number of traps being monitored. Another fifty 708 Acoustic Transmitters were installed on 50 of the next (priority) tier of traps.

“Steam management is critical to us,” the Facilities Manager stated. “We use it to heat ovens, heat oil to fry the chips, for sterilization, and many other things. We now have 100 out of 400 traps being monitored, and have plans to install another hundred in the near future. We expect to continue reducing our energy costs and improving our carbon footprint. The cumulative savings will help these projects pay for themselves.”



Heat recovery boilers capture heat from toasting ovens, convert it to steam and re-introduce the energy into the main steam line.

RESOURCES

Emerson Food and Beverage Industry

Emerson.com/Food&Beverage

Rosemount 708 Wireless Acoustic Transmitter & Steam Trap Monitor

Emerson.com/Rosemount/Wireless/708-Acoustic

**Global Headquarters
Emerson Automation Solutions**

6021 Innovation Blvd.
Shakopee, MN 55379, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RFQ.RMD-RCC@Emerson.com

**Europe Region
Emerson Automation Solutions
Europe GmbH**

Neuhofstrasse 19a P.O. Box 1046
CH 6340 Baar, Switzerland
+41 (0) 41 768 6111
+41 (0) 41 768 6300
RFQ.RMD-RCC@Emerson.com

**Middle East and Africa Region
Emerson Automation Solutions**

Emerson FZE P.O. Box 17033,
Jebel Ali Free Zone - South 2
Dubai, United Arab Emirates
+971 4 8118100
+971 4 8865465
RFQ.RMTMEA@Emerson.com

**Asia Pacific Region
Emerson Automation Solutions**

1 Pandan Crescent
Singapore 128461
+65 6777 8211
+65 6777 0947
Enquiries@AP.Emerson.com