

## **Cypress EnviroSystems Application Note Steam Trap Energy Savings August 2008**

### **Energy Savings Opportunity: Detecting Steam Trap Failures and Avoiding Expensive Leaks**

Many facilities produce steam for heating or manufacturing processes. The steam is typically piped from a central boiler(s) to various locations on site where the steam is used.

“Steam traps” are mechanical devices installed on the pipes to remove condensate from the steam flow; they are needed to maintain the proper operation of the steam distribution system. A typical industrial plant or university site may have several hundred or even thousands of steam traps.

Unfortunately, steam traps have a tendency to leak, which can add up to thousands of dollars per year of wasted steam for a single steam trap. This was probably less important when the original steam system was built years ago, but with today’s energy prices, it is critical to detect and correct failures quickly. On average 15-25%<sup>1</sup> of steam traps are leaking at existing installations, which means hundreds of thousands of dollars of wasted energy per year per site.

*Figure 1 – Signs of a leaking steam trap*



*Figure 2 – Typical steam trap installation*



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<sup>1</sup> US Department of Energy, Federal Energy Management Program – March 2001



Figure 4 – Non-invasive Wireless Steam Trap Monitor installation



### Application Example:

A plant in New England was constructed in 1964 and has 400 steam traps with 1/8" orifice, and 150 larger traps with 1/4" orifice, operating at 105 psi steam pressure. They perform an annual audit of the traps at a cost of approximately 140 man-hours or \$20,000 each time, requiring about calendar month to complete.

All failed steam traps uncovered during an audit are replaced, but during the course of a year, approximately 15% of the steam traps fail and start to leak. On average, it takes six months before the leaks are detected at the next audit. Assuming steam cost at \$10/thousand lbs, the leakage would waste \$375,000 per year.

To reduce the leakage costs, the plant manager decided to install the WSTM on all steam traps. The installation would require one month at a total cost of approximately \$650 per steam trap. The WSTM system would detect and thereby reduce steam leakage by 95%, and reduce audit labor by 70%. The overall project would deliver a payback of 12 months.

Figure 5 – Cost of Steam Leakage due to Failed Steam Traps

	1/8" orifice	1/4" orifice	
Total number of steam traps with 1/8" orifice	400	150	units
% of traps failed/leaking	15%	15%	
Avg number of months leaking before detection	6	6	assuming one year audit interval
Amount of steam leaked per year	15,000,000	22,500,000	lbs
<b>Cost of leaked steam for all 1/8" orifice units</b>	<b>\$150,000</b>	<b>\$225,000</b>	<b>@ \$10/thousand lbs of steam</b>
<b>Total Cost of Leaks per year =&gt; \$375,000</b>			

Figure 6 – Payback period calculation

Total cost to install WSTM on 550 steam traps	\$357,500
Savings Total	\$371,650
<i>Energy savings (avoided 95% of steam leak)</i>	\$356,250
<i>Labor savings (reduced time by 70%)</i>	\$15,400
<b>Payback Period (months)</b>	<b>11.5</b>

About Cypress Envirosystems:

Cypress Envirosystems is a subsidiary of Cypress Semiconductor (NYSE: CY). Its mission is to save energy and improve productivity in older plants and buildings, using state-of-the-art non-invasive and wireless technologies to minimize disruption and cost, delivering payback of 12 months or less. More information is available at: [www.cypress.com/systems](http://www.cypress.com/systems) or call (408) 943-2800.