2012 24-WEEK INTERNSHIP

PROCTER & GAMBLE

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COMPANY BACKGROUND

Procter & Gamble started in 1837 as a small soap and candle company based in Cincinnati, Ohio. It has since grown to a multi-billion dollar Fortune 500 company with facilities worldwide and products ranging from beauty and grooming to household care. The Procter & Gamble facility in Iowa City began operation in 1956 and manufactures shampoos and conditioners, oral rinse products, and body wash. The brands produced are Pantene®, Head & Shoulders®, Herbal Essences®, Aussie®, Gillette®, Scope®, Crest Pro Health®, Olay®, Old Spice®, and Ivory®. The plant employs approximately 630 people in its manufacturing facility.

PROJECT BACKGROUND

The Procter & Gamble Hair Care site in Iowa City, Iowa, has waste heat sources spread throughout the facility. The purpose of the 24-week intern project at Procter & Gamble was to assess and research technologies to recapture, transfer and store heat energy, identify inefficiencies in the steam trap program and optimize boiler efficiency. .

INCENTIVES TO CHANGE

In an effort to improve the environmental profile of its operations, Procter & Gamble's goal is to reduce production of energy, waste, CO2, and water usage by 20 percent in 2012, as compared to 2007 data. While the company has achieved a reduction per unit of production of 57 percent in waste and 22 percent in water usage, energy and CO2 have only been reduced by 16 percent and 12 percent respectively.

Therefore, the goal of the Procter & Gamble Iowa City site is to reduce electricity and natural gas usage by 20 percent. Accomplishing this goal will not only support Procter & Gamble as a whole, but will also reduce utilities costs and emissions.

RESULTS

Replace Failed Steam Traps: Surveys have been conducted for 257 of the estimated 550 steam traps at the facility with 31 traps testing as failed. It is estimated that $700-$1,600 per year can be saved for each steam trap replaced. $156,443 in steam cost can be saved per year by installing new traps.

Removable Steam Trap Insulation: Currently, most steam traps are not insulated. Upon investigation, it was found that only float style traps are generally recommended for insulation as the function of the trap will not be affected. While installing removable insulation on all float style steam traps will save energy, the most cost effective solution is to focus on insulating steam traps on 100 psi steam lines. This option will save $161 per year and a total of $1,821 during the lifetime of the insulation.

Comprehensive Steam Trap Program: Steam energy is currently being lost to leaks and failed steam traps. The intern worked with utilities personnel to implement a comprehensive steam trap maintenance program including steam trap testing techniques, a rotating schedule for trap surveys, established protocols for trap replacement, standards for trap installation, equipment training, and resource materials creation. Steam trap maps were created for the areas of the facility surveyed in summer 2012 for ease of future trap surveys. Training was organized for ultrasonic measurement in steam trap surveys. A consistent steam trap maintenance program with rapid replacement of failed steam traps will result in an additional $30,836 of energy savings per year.

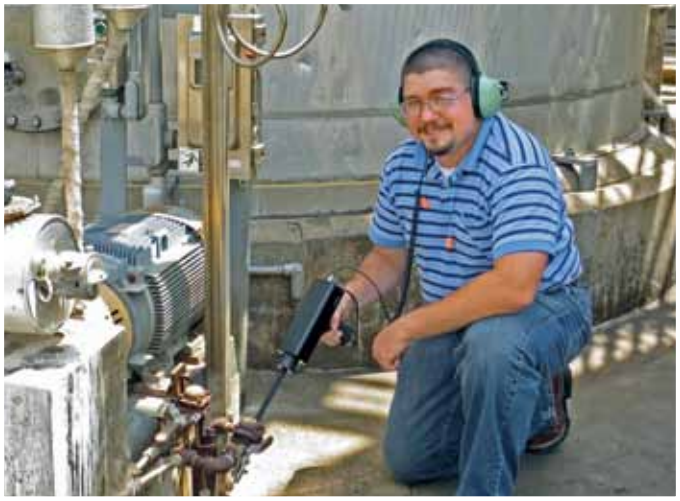
Condensate Return Line Insulation: During investigation of the steam system, a condensate line was discovered to have no insulation. Insulating the condensate line will save $3,150 in steam production cost.

Improve Sulfation (SLS) Mixing Process: The current process for mixing SLS utilizes hot reverse osmosis (RO) water and is cooled using a low temperature water source. A recently installed cold RO line for this system has presented an opportunity to mix cold and hot RO to approach the target temperature. Changing the process will save $26,028 per year in hot RO energy costs.

Boiler Economizers: Two of Procter & Gamble's boilers currently have no economizers. Installing economizers on these two boilers to preheat boiler feed water could save $99,410 per year in natural gas cost.

Catalogued Waste Heat Recovery Opportunities: Waste energy sources and possible energy sinks were investigated throughout the facility. If all sources and sinks could be utilized, there is a potential for $618,447 of savings per year. Due to the many intermittent sources and sinks present, more development is needed to devise systems to store and transfer this energy.

Scrubber Pit Energy for City Water Preheating: One of the waste energy sources investigated was scrubber pit water going to the sewer. Using this energy to preheat city water going into the facility can save $34,503 per year, with a payback of less than two years on the installation.



CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS

TOTAL FOR ALL SECTORS							
CO_2	SO_2	CH_4	N_2O	CFC	NO_X	VOC	PM_{10}
810.09	2.23	1337.23	4.84	10.66	2.42	5.14	0.19

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
REPLACE FAILED STEAM TRAPS	$156,443	372,484 THERMS	RECOMMENDED
REMOVABLE STEAM TRAP INSULATION	$161	384 THERMS	RECOMMENDED
COMPREHENSIVE STEAM TRAP PROGRAM	$30,836	73,419 THERMS	IN PROGRESS
CONDENSATE RETURN LINE INSULATION	$3,150	7,499 THERMS	RECOMMENDED
IMPROVE SULFATION (SLS) MIXING PROCESS	$26,028	61,970 THERMS	RECOMMENDED
BOILER ECONOMIZERS	$99,410	236,691 THERMS	RECOMMENDED
CATALOGUED WASTE HEAT RECOVERY OPPORTUNITIES	$618,477	1,472,565 THERMS	ADDITIONAL DEVELOPMENT RECOMMENDED
SCRUBBER PIT ENERGY FOR CITY WATER PREHEATING	$34,503	82,152 THERMS	RECOMMENDED