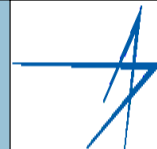


LOCKHEED MARTIN HEAVY INDUSTRY PROGRAM



WE NEVER FORGET WHO WE'RE WORKING FOR

Goals: Increase the energy efficiency of the facility's regenerative thermal oxidizer

Strategies: Replace metal-to-metal poppet valves with metal-to-silicone and add one foot of ceramic media

Benefits:

- Decrease in energy loss
- Energy Savings:
59,806 therms annually

Equipment Installed:

- (1) Metal-to-Silicone poppet valve
- One foot of ceramic media

Financial Analysis:

- Total Project Cost:
\$138,000
- LM Paid Incentive:
\$59,806
- Energy Cost Savings:
\$48,508
- Simple Payback In:
1.6 years

Air Abatement System Efficiency Improvement



The Corporation in this study is a manufacturer of numerous molded and fabricated foam products. The fabrication of expanded polystyrene (EPS) produces pentane as a byproduct, which is a volatile organic compound (VOC). This chemical must be removed prior to being exhausted to the atmosphere, by means of a Regenerative Thermal Oxidizer (RTO). The RTO must operate continuously to maintain abatement of the pentane in the curing process.

The facility makes foam products during from 7:00 AM to 11:00 PM, allowing them to cure overnight. The regenerative thermal oxidizer runs in the mold machine and bag rooms during the day, at a rate of 9,000 CFM to serve production, but is turned down to 5,000 CFM at night to serve only the bag room. Testing was performed on the RTO with four feet of ceramic media that showed heat recovery efficiency of 89%, at an average of 8,700 CFM during production.

Continue on reverse....

Energy Engineers audited the facility and concluded that design improvements can allow the efficiency to reach 96%. Metal-to-metal poppet valve seals are currently sealing the manifold, however they require added pneumatic air to seal the manifold properly. This pneumatic air can leak into the manifold, and must be heated to operating temperature. Replacing these with metal-to-silicone seals will eliminate the need to add and heat pneumatic air.

A second update consisted of adding ceramic media to the RTO. Ceramic media will recover more heat from the exhaust gas so that it will be used again to heat the incoming emission stream. There were originally four feet of ceramic media, by adding one foot the heat recovery effectiveness can be increased resulting in a reduction of natural gas consumption. Based on the measured results in both the production and non production operation, the improvements resulted in a retrofit thermal energy recovery of 94.3%.

The total project cost was \$138,000 with a Lockheed Martin paid an incentive of \$59,806. The energy savings was 59,806 therms annually, corresponding to a cost energy savings of \$48,508 a year. These savings make a simple payback of only 1.6 years!

Project Team:

- **Pacific Gas and Electric Company**
- **Lockheed Martin Energy Services Inc, Heavy Industry Program**



**For Further Information About
Our Services, Contact:
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Www.lmsi-pge.com**

It is our objective to assist PG&E heavy industry customers in:

- Improving their competitive position
- Identifying process-focused energy improvements and other opportunities (e.g. demand response)
- Facilitating electricity and natural-gas energy efficiency equipment and demand reduction upgrades
- Reducing Operating costs per unit of product
- Improving product quality and production rate
- Reducing waste, pollutants, and Green House Gas emissions

**Remember that increased production efficiency = lower production costs
= increased profits**

The Heavy Industry Efficiency Program is managed and facilitated by Lockheed Martin Services Inc. (LMSI), and is funded by California utility ratepayers, under the auspices of the California Public Utilities Commission. The program objective is to identify and facilitate the implementation of major process-orientated and other energy-efficiency upgrades for PG&E's heavy industry customers. Customers that install energy efficiency systems receive incentives based on the annual kWh or therm saving achieved.