CLAYTON INDUSTRIES

STEAM GENERATOR PRESENTATION
ESC- Pony Boilers

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SOME OF THE NAMES
BEHIND OUR GOOD NAME

Unilever
CATERPILLAR
CHRYSLER
IBM
FMC

MANNINGTON
OUR COMPANY

DOW CORNING
3M
Ford

bp
Kodak
Coca-Cola

MeadWestvaco

DuPont
Georgia-Pacific

P&G

Nestle
PEPSI
MONSANTO

GOOD YEAR
Clayton INDUSTRIES

SIEMENS
Pony Boilers- Commercial

- What to look for
- Savings
- Advantages
1. Pony Boilers

**What to look for:**
- What is the actual steam load profile? Min/ Max
- Is the summer load the same as winter load?
- Is header pressure critical to operation?
- Does the boiler start each day? Operating Profile
- Have other energy efficiency measures lowered steam load?
- Is the majority of the steam load actually hot water or low pressure steam?
Pony Boilers

- **Savings**

- Is there an advantage in cost going to low pressure steam or hot water?
- Can there be a savings in Operators – Stationary Engineers?
- What is real efficiency of Existing plant at current operating loads? Are Economizers installed?
- Blowdown minimized, water quality.
Super Economizer

- **Clayton SE Steam Generator** -
  Stack Temperature is 80°-100°F below steam temperature.

- **Firetube Boiler** -
  Stack temperature is 80°-100°F over steam temperature.

- 40° F of stack temperature equals 1% of fuel to steam efficiency

- **Clayton Steam Generator** is 4-5% inherently more fuel efficient.
Pony Boilers

- **Advantages**
  - Updated boilers sized for actual load
  - Increased efficiency with properly sized steam boiler matched to load - low pressure or hot water units to suit load
- **Safety**
- **Operator Status**
- **What are low load losses and associated efficiencies?**
- **Controls - VSD - Linkageless**
The Clayton steam generator gives the following advantages:

- Reduced fuel/gas cost
- Shorter start-up time
- Cold stand-by
- Minimum space and weight
- Quick response with full steam pressure
- Safety – explosion proof

(on line, Warm stand-by)
Full .....steam within 5 minutes from a cold start; will instantly meet any load requirement.
ON LINE

WARM STAND-BY

ON LINE

COLD STAND-BY

Cold Stand-by
Minimum Space (12 Mw)
WHY CLAYTON?

Saves Space
Water and Steam System
Counter-flow Coil Design
Low NOx Burner System
Specifications

• Sizes: 25 to 1,200 bhp

• Steam Output: 690 to 41,400 lbs./hr.

• Pressure: 15 to 2600 psi.

• Fuels: Natural Gas, Propane, Oil, Biogas and Waste Heat

• Controls: 25 - 35 bhp, Step-fired, relay logic; 50-1,200 bhp, modulating (5 to 1 turn down) PLC
Clayton Product Range

- Steam Generators and Fluid Heaters
- Feedwater Systems
- Feedwater Treatment
- Packaged Systems
- Super Economizer
- Low NOx - Low CO
- Exhaust Gas and Waste Heat Recovery Systems
- Super Heater Module
Exhaust Gas and Waste Heat Recovery Systems

- Typical applications include cogeneration, incinerators, glass furnaces, stationary engines, enameling ovens.
- For land-based, off-shore, and ship board use.
- Exhaust temperatures from 425 to 3200 deg. F and gas flow rates from 300 to 330,000 lbs./hr.
Skid Installation
Some references
THANKS FOR YOUR ATTENTION
MOUNT CLEMENS REGIONAL HOSPITAL

IMPROVING RELIABILITY
REDUCING FUEL COSTS
MOUNT CLEMENS REGIONAL HOSPITAL

- Mount Clemens, Michigan
- Established 1945
- 280 Acute Bed Hospital
HOSPITAL OBJECTIVE

• Maintain Competiveness In A Changing Healthcare Market In Part by:

  ▶ Conduct a System Wide Energy Audit

  ▶ Implement Changes to Reduce Energy Cost While Generating Positive Cash Flow From the Changes that Meet the Hospitals ROI
HOSPITAL STEAM REQUIREMENTS

- Redundant System
- Seasonal and Fluctuating Loads
  - Absorption Chiller
  - Heat Load
  - Domestic Hot Water
  - Autoclaves
  - Laundry

▲ Consider Space and Safety
Pre-Audit Equipment

(2) 400-BHP Firetube Boilers
(2) 300-BHP Firetube Boilers
Utilized Existing Feedwater Treatment Components
Post-Audit Equipment

(1) 500-BHP Clayton Steam Generator
(1) 300-BHP Clayton Steam Generator
FIRST YEAR SAVINGS

Reduction of about 50,000 mcf of gas

Savings in Fuel of about $430,312.
Flat Efficiency Curve

Study by San Diego State University

*For companies who have process steam loads, it represents 45% of their energy consumption

• The average load of a boiler in an industrial application is 40% of capacity
  • *DOE

![Flat Efficiency Curve Diagram](image-url)
Additonal Operating Efficiency Improvements

• Quick Start-up
Eliminate the need to start the boiler 1 to 2 two hours before it is needed or to keep a boiler in a warm state during periods of non-use, such as during the evening, weekends, for requirements of a redundant/back up system and/or to be ready to meet steam load.

• Cold Standby
Standby losses are generated when the boiler is under pressure and no steam is produced. These losses were eliminated at Mount Clemens General Hospital.

• High Steam Quality
Higher quality steam means more BTUS per pound of steam and, thus, fewer pounds of steam needed. Higher Steam Quality accounted for a minimum of a 1.5% improvement in fuel efficiency for the hospital.

• Reduced Blowdown
Blowdown in a Clayton Steam Generator is typically 1/8th to 1/10th of blowdown in a firetube boiler. Blowdown water contains heat so the less the blowdown the less the loss of heated water, chemicals and softened water.
Questions or Comments?