



LIPTENTM

A Quarterly report from the "Hands On" EPC Energy Solutions Company

advantage

1st Quarter, 2011

Steamin' Hot NEWS

- 2010 Represented a significant increase in Energy Center projects compared to the previous year. 2011 looks to surpass 2010!
- Several new projects have been awarded to Lipten and many other projects have great potential. Details inside.
- Natural gas conversion of coal boilers is making a comeback. Lipten pioneered the vertical burner concept and has converted numerous coal boilers to fire natural gas.

HISTORIC QUOTES

"The most successful business man is the man who holds onto the old just as long as it is good and grabs the new just as soon as it is better."

-Robert P. Vanderpoel

"As long as you're green, you're growing; as soon as you're ripe you start to rot."

-Ray Croc

"I do not believe you can do today's job with yesterday's methods and be in business tomorrow."

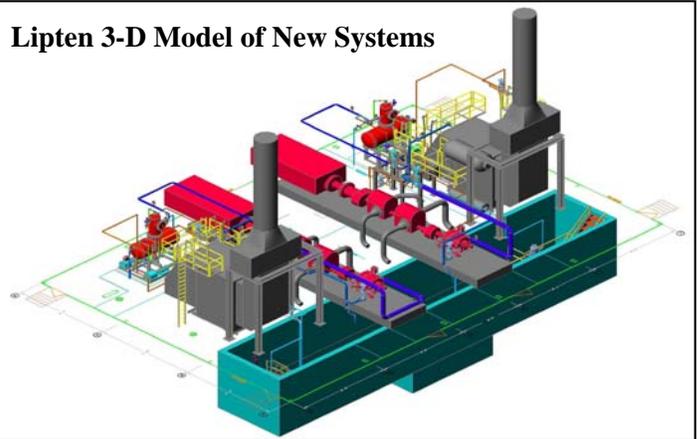
-Nelson Jackson

Oklahoma Steam Generator and Turbine Project

Lipten is nearing the completion of engineering & procurement and will soon begin turn-key installation. This project involves the replacement of two Heat Recovery Steam Generators (HRSG) and two steam turbines. Other new equipment to be installed includes: Two deaerators with feedwater systems, turbine gland steam condenser, turbine related control valves, turbine bypass desuperheater station, turbine seal steam desuperheater station, and HRSG blowdown systems.

Building modifications are also included where required to remove the existing equipment and install the new units. The project includes, furnishing and installation of structural steel, piping, piping systems, and insulation.

Lipten 3-D Model of New Systems



This combined cycle facility consists of two units, each with a gas turbine, HRSG and a steam turbine to drive tandem natural gas compressors. Waste heat from the gas turbine is directed into the Heat Recovery Steam Generator (HRSG) where steam is produced to drive the steam turbine. The older existing HRSG's are vertical flow forced circulation type steam generators. The older HRSG's are currently producing approximately 22,500 lb/hr steam at 840 °F and 320 psig. The new system will produce up to 30,200 lb/hr of high pressure steam from the same amount of waste gas. This will significantly increase the overall efficiency of the facility.

Lipten's Randy Flanagan is the lead engineer for this project. His expertise in high pressure boiler and turbine technology comes from several years of experience as lead project engineer in several utility power plants with capacities of up to 780 MW.

CONTROLS CORNER



Jason Bradshaw
Senior Technician

What is “Jackshaft,” “Parallel Positioning,” and “Full Metered” control of gas or oil fired burners?

Jackshaft

A single modulating actuator is connected to a shaft that interconnects between the Air Damper and Fuel Flow Control

Valve. The control positions the actuator proportional to the demand signal based on a single mechanical linkage characterization profile for fuel / air relationship established during configuration.

Parallel Positioning

This control system allows for independent control of the Combustion Air from the Fuel control device. Actuators are connected to the Air Damper and Fuel Flow Control Valve(s). The controller contains “lookup” tables to characterize the position of the independent actuators, proportional to the demand signal. Precision control can be realized as the Air and Fuel can be independently controlled.

Full Metered

A Full Metered, Cross Limited control system allows for independent control of the Combustion Air from the Fuel control device (similar to Parallel Positioning) and additionally includes flow measurements, confirming process conditions to provide a closed loop control scheme. Full Metered control also offers the following benefits:

- Additional safety: “Cross limited” means that actual flow of fuel and combustion air is measured to ensure that a dangerous fuel rich or lean environment is avoided.
- Easy start-up. System configuration simplified since the closed-loop systems adjusts as needed for optimization of the fuel- air ratio.
- Maximize efficiency and minimize emissions over the entire range of the burner (not just at the setpoint and conditions during initial configuration.)
- Automatically compensates for changes in combustion or process conditions, maximizing burner performance.
- Provides real-time combustion information.

Spotlight On . . .

Chris Drew

Senior Project Manager



Chris Drew, Project Manager

As the main point of contact for the client during the course of the project, Chris becomes the “face” of Lipten. Chris is often complimented on his unique ability to facilitate excellent working relationships with clients, contractors, vendors, authorities having jurisdiction and other parties involved in complicated industrial construction projects. Chris’s attention to detail ensures that projects are constructed as specified and on schedule.

“My favorite aspect of managing complex Energy Center projects is to see the drawings and 3D models become reality.”

Chris obtained a B.S. in Engineering from Michigan Technological University in 1992 and is EIT certified. Chris has managed projects of over \$60 Million. A project that showcased his Energy Center project management excellence was the turn-key design and construction of a new greenfield Energy Center including four boilers (300,000 lbs/hr total), chillers (6,000 ton total), and air compressors (3,382 SCFM total). Chris was also integral to an engineering study for a major utility company which reviewed 151 individual steam users and evaluated the return on investment for a design-build steam plant instead of utilizing a centralized city thermal supply.

“My favorite aspect of managing complex Energy Center projects is to see the drawings and 3D models become reality” said Chris. “It is exciting to see all the components and sub-systems integrated into functional systems. Start-up is a particularly exciting time. Start-up is when it all comes together and you can finally see the results of months of design and construction efforts.”

Natural Gas Boiler Conversion

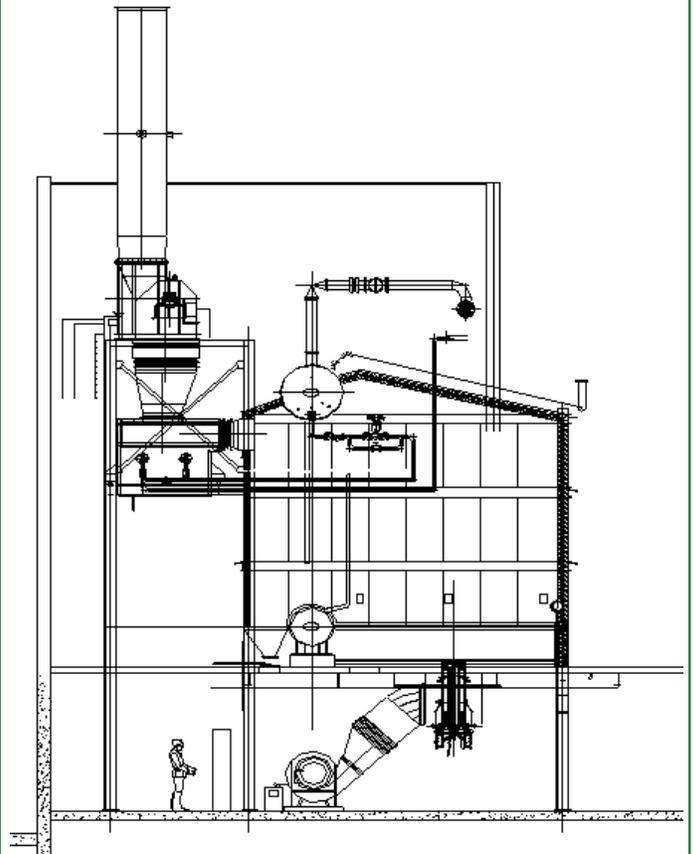
Why Convert?

Many facilities are upgrading their power plants by converting existing coal fired boilers to natural gas for the following reasons:

- Eliminate coal storage/handling maintenance problems.
- Eliminate operations, maintenance and environmental problems associated with ash handling.
- Improved operational flexibility. Coal boilers typically have limited turndown capabilities.
- Improved boiler operating efficiency. Typically, coal fired boilers operate with relatively high levels of excess air to ensure complete combustion. Further, since they operate with a balanced draft or slightly negative furnace pressure, there is usually a large quantity of “tramp air” infiltration into the furnace resulting in even higher excess air levels at the boiler outlet.
- Reduced NO_x, SO₂, CO and particulate emissions. With the continued environmental focus on the reduction of emissions of nitrogen oxides (chemical compounds formed during the combustion of fossil fuels which react with volatile organic compounds and, in the presence of heat and sunlight, form ozone), many coal-fired plants are looking to convert to natural gas firing to meet future anticipated regulations. In addition, present and future emission requirements for coal-fired boilers include the addition or upgrading of backend cleanup equipment for reduction and control of particulate emissions. Baghouse, Precipitator, De-NO_xing, and Scrubber systems are normally selected to reduce NO_x, SO₂ and particulate emissions.
- Eliminate heavy metal emissions, such as mercury.

Advantages of the Vertically Fired Burner:

- Optimum flame geometry for a specific furnace configuration
- No modifications to pressure vessel - reduced outage period.
- Uniform heat flux throughout the furnace chamber
- Eliminate hot spots promoting improved water circulation patterns
- Increased boiler life
- Improved thermal efficiency
- Improved overall boiler performance
- Lower operating excess air levels
- Simplified operation and reduced maintenance costs
- Guaranteed zero flame impingement
- Significant reductions in NO_x and Carbon Monoxide (CO) emissions





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Lipten Company is an Engineering, Procurement and Construction (EPC) firm that specializes in Central Energy Plant (CEP) General Contracting. Lipten also has a controls group that provides traditional and custom control solutions.

We provide steam generation, power generation, chilled water systems, compressed air systems, water treatment systems, controls and related Energy Center equipment and services. Our level of support can vary from an advisory role to complete turn-key facility construction. Services include: design, engineering, drafting (CAD), equipment specifications, procurement, installation, construction management, site audits, start-up, operator training and maintenance.

PROJECT NEWS

Contracts recently awarded to Lipten:

- Custom plant master control system and process monitoring for a hospital in New York.
- New Energy Center including steam and compressed air systems and a new natural gas main supply for an airport in Michigan.
- Turn-key upgrade of a wood-fired process dryer in Indiana.
- New steam and chilled water central utility plant for a food processing company in Chicago: The project also involves the demolition of an abandoned five-story refinery building and smaller warehouse building to allow for installation of a new parking lot.
- Several controls projects involving equipment controls, plant-wide Master Panels, and Supervisory Control and Data Acquisition (SCADA)