



BURNERS

FLARES

THERMAL OXIDIZERS

VAPOR CONTROL

RENTALS

AFTERMARKET



ZEECO

Retrofit, Aftermarket & Service Capabilities

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Aftermarket Services Manager: Power

Retrofit, Aftermarket & Service Capabilities



Topics to be covered

- Retrofits
 - General Retrofit Information
 - Fuel Conversions
 - Emission Considerations
- Aftermarket
- Service

Retrofits

General Information



Retrofit Information



➤ Retrofit Market

■ Conversions

- Fuel Conversion
 - Coal to NG, Oil
- Change in Boiler rating
 - De-Rate
- Change in Emission requirements
- Reliability improvements
- New Equipment may be too expensive
- New Equipment may be too difficult to install
- Upgrading systems which may include:
 - Burners
 - Valve trains
 - Controls

Retrofit Information



➤ Types of Boiler Conversions:

- Package Boiler
- Multi-Burner Boiler
- Stoker
- BFB, CFB
- Kilns
- Recovery

➤ Burner Configuration

- Front Fired
- Opposed Fired
- T-Fired

Retrofit Information



- General Information needed:
 - Design Heat Input (MMBtu/hr.)
 - Combustion Air/FGR temperature and duct losses
 - FD/ID fan information, manufacturer, ratings, curves
 - Windbox/furnace dP (RDL)
 - O₂ (excess air) control range
 - Windbox/duct dimensions
 - (if applicable) OFA ports with:
 - Elevation
 - Size
 - Separation
 - Quantity
 - Location
 - Waterwall openings

Retrofit Information



- Recent Fuel analysis (ultimate analysis)
- Available fuel pressures
- Common Fuel
 - Natural Gas
 - Refinery Gas
 - Oil (#2, #6, ULSD, etc.)
 - Low-Btu
 - Waste, etc
- Existing Control System:
 - BMS, CCS, DCS, O₂ Trim
- Existing Flame Scanners
- Existing Igniter/Pilots (NFPA Class & Fuels)



Retrofit Information

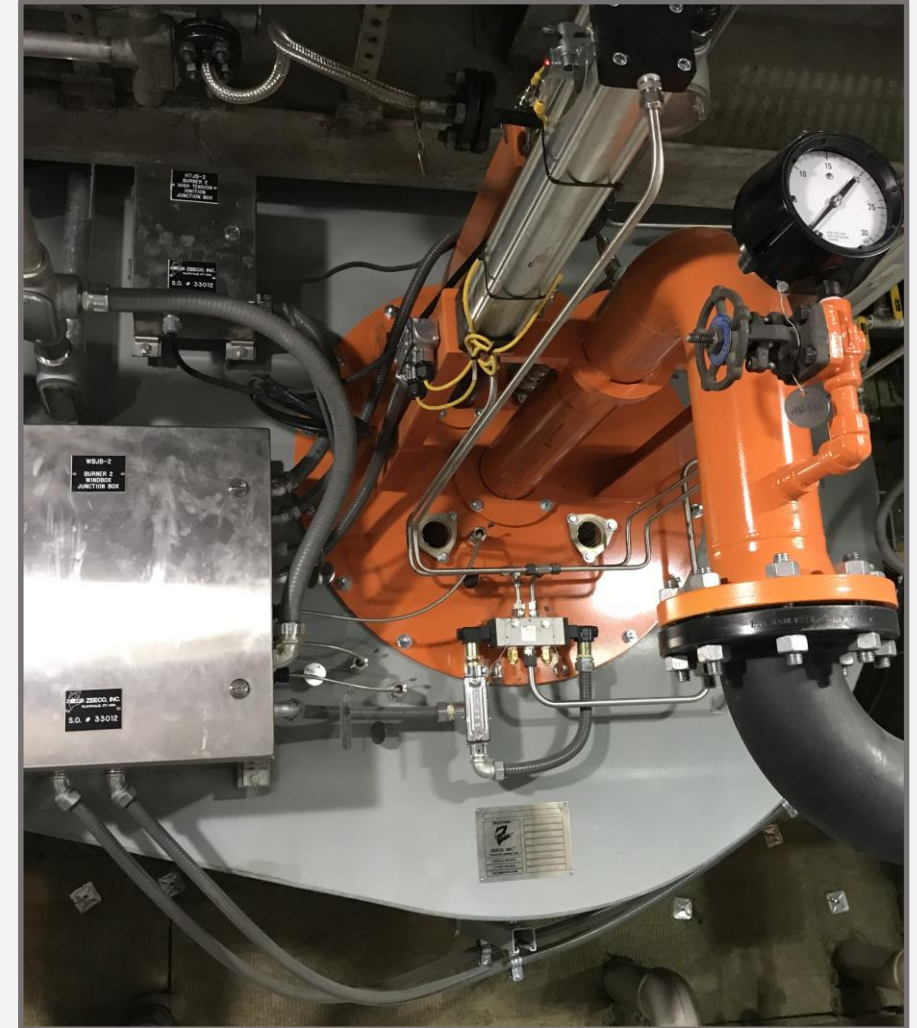


- Maintenance reports/pictures from past outages
- Operator comments, experience and details on boiler operation
- Any existing issues to be addressed/solved?
- Requirements of approved manufacturers of ancillary equipment (valving, BMS PLCs, etc.)
- Boiler and platform details for installation assistance – Access, entry points

Retrofit Information



- Where to find Information:
 - Boiler manufacturers data sheets (OEM manuals)
 - General arrangement drawings (front, side, refractory, tubes)
 - Burner drawings
 - Windbox/duct drawings
 - Fan curves
 - Maintenance Reports
 - Operating data (PI data)



Retrofit Information



➤ Retrofit of Four (4) Low NOx Burners



Retrofits

Fuel Conversions



Fuel Conversions



Fuel Train Retrofit Opportunities

- New/Multiple fuels
- Reliability
- Multiple options for code compliance
 - NFPA, EN, CSA, AGA, ASME
- Gas Train Components
- Shutoff valves
- High & low pressure switches
- Control valves
- Pressure regulators
- Transmitters, switches



Retrofits

Emission Considerations



Emission Considerations



➤ What factors determine emissions?

■ NO_x

- O₂ Excess Air
- Furnace Construction/Refractory detail
- Combustion temperature
- Reaction with Nitrogen
- Lowering CO

■ CO

- O₂ Excess Air
- Combustion efficiency
- Low NO_x & FGR
- Combustion temperature



Emission Considerations



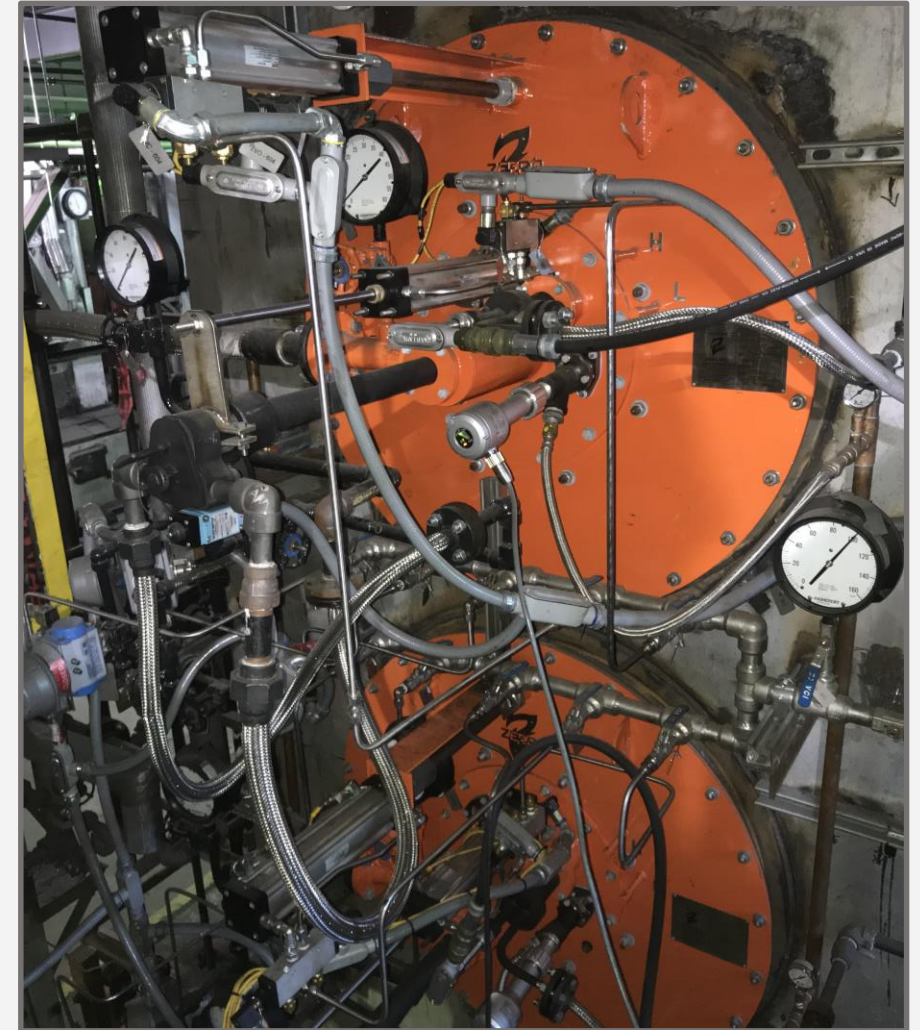
➤ What factors determine emissions?

■ VOC

- Combustion efficiency
- Combustion temperature

■ SO_x

- Fuel dependent, sulfur content
- Particulate



Aftermarket



Aftermarket



Aftermarket Topics to discuss

- In kind replacements
- Zeeco plug/play replacements
- Fuel additions
- Markets to target

Aftermarket



Capabilities

- Currently there are over 350 ZEECO Power Burners installed in the U.S. (round & duct burners)
- Currently offer a recommended spare list for ZEECO Burners
- What can we offer to non-Zeeco burner customers:



Aftermarket



➤ In kind replacements:

- Burners
 - Swirlers/diffusers
- Igniters
 - HT/HE
- Oil guns
 - Atomizers
- Gas Guns
- Gas Rings (internal)
 - Drilled orifices
 - Right angle design nozzles/spuds



➤ Zeeco Plug/Play Replacements

- Burners
- Burner Inserts
 - Z-jets
 - Swirlers/diffusers
- Igniters/Pilots
 - HT/HE
 - ARGs
 - ZA2
 - ZHENG
 - Zarg
- Oil Guns
 - Z1-Z3 QD Design
 - Atomizers (Constant/Differential pressure designs)
- Gas Guns
 - 2MM-50MMBtu
- Gas Rings (internal)
 - Drilled orifices
 - Right angle design nozzles/spuds



Aftermarket



➤ Fuel Additions

■ Gas

- Natural
- Propane
- COG
- Low Btu
- COG

■ Liquid Fuel

- 2
- Oil
- ULSD
- 6 Oil



➤ Markets to Target

▪ Existing Customers with following burners:

- Coen
- TODD
- Peabody
- John Zink
- Victory?
- B&W



- Where have we successfully sold & installed Zeeco Components in non-Zeeco Burners:
 - UMASS
 - Oil Guns
 - Atomizers
 - Dartmouth College (Boiler 1)
 - Oil Guns
 - Venturi
 - Swirler
 - Empire Generating
 - Flame Stabilizers

- Where have we successfully sold & installed Zeeco Components in non-Zeeco Burners:
 - Puerto Rico Power Authority
 - Oil Gun Components
 - Swirlers
 - Dartmouth College (Boiler 2)
 - Swirler
 - Entergy (Nine Mile)
 - Igniter
 - Allnex
 - Swirler

Service



Service



- 2019:
- Two (2) Service Engineers on Staff
- Three (3) Application Engineers Used on Commissioning Duct Burners
- Six (6) Sub Contract Service Personnel
- One (1) Internal Service Coordinator

Plan to Increase Service Revenue

- Promote Annual Service Contracts
- Increase number of Boiler MACT Inspections and testing
- Routine inspection and maintenance contracts
- Potential Burner (Round & Duct) and BMS upgrades and/or replacements
- An Example of New Markets:
 - Ethanol Plants to provide:
 - Service work
 - Spare parts

How do we do this?

- Using our database & identifying Zeeco & non-Zeeco equipment in each reps territory
- Contacting these customers & introducing them to Zeeco and our capabilities
- Promote inspection and maintenance contracts
- Potential Burner and BMS upgrades and/or replacements
- Burner Training
- Boiler Training?
- Recommended Spare Parts for
 - Burners
 - Igniters
 - Scanners

Retrofit, Aftermarket & Service Capabilities



➤ Summary

- As Zeeco grows its Power Group so does our population of Burners, Controls & Fuel Supply Equipment
- Zeeco has the experience & knowledge to replace in kind or retrofit components for all burner manufacturers
- Zeeco has experienced service technicians to tune Coen, TODD, Peabody, John Zink & other burner equipment

GO

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