

Worldwide Pollution Control Association

Gulf Power Coal to Gas Seminar
May 30-31, 2012

All presentations posted on this website are copyrighted by the Worldwide Pollution Control Association (WPCA). Any unauthorized downloading, attempts to modify or to incorporate into other presentations, link to other websites, or to obtain copies for any other purposes than the training of attendees to WPCA Conferences is expressly prohibited, unless approved in writing by the WPCA or the original presenter. The WPCA does not assume any liability for the accuracy or contents of any materials contained in this library which were presented and/or created by persons who were not employees of the WPCA.



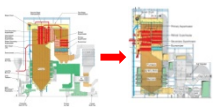
Visit our website at www.wpca.info

W
P
C
A



thebabcock&wilcoxcompany

Gas Conversion Fundamentals



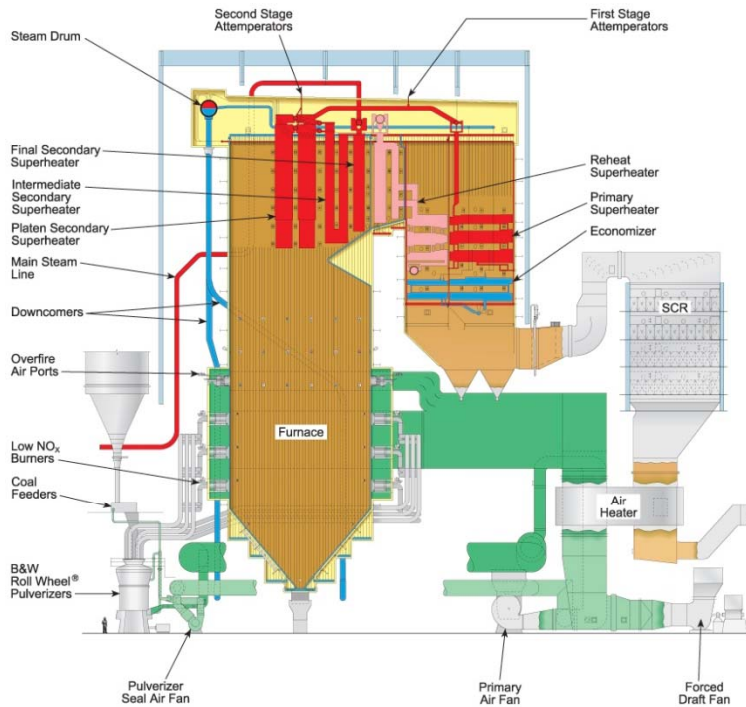
Don Ryan
Division Mgr, BWSC Engineering

Gas Conversion Fundamentals

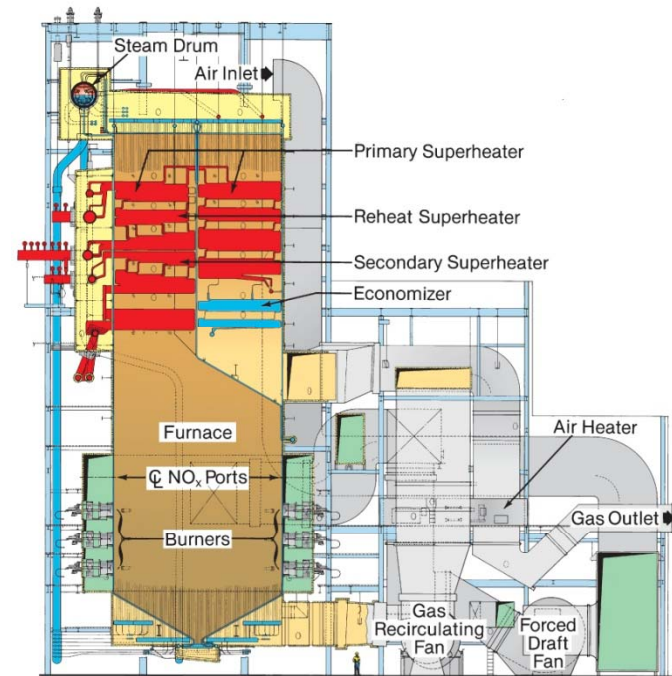
So you want to
Convert this...

Into

This?



Typical PC Boiler



Typical Gas Boiler

Gas Conversion Fundamentals

Typical Fuel Analysis Comparison

Proximate (% by wt)	Natural Gas			
	Bituminous	PRB	Gas	
Moisture	3.5	27.22	90.0	CH ₃ (% by vol)
Volatile	35.7	29.90	5.0	C ₂ H ₆ (% by vol)
Fixed Carbon	51.8	37.17	5.0	N ₂ (% by vol)
Ash	9.0	5.71		
Ultimate (% by wt)				
Carbon	72.8	49.99	69.20	
Hydrogen	4.8	3.62	22.65	
Sulfur	2.2	0.33		
Oxygen	6.2	12.43		
Nitrogen	1.5	0.70	8.08	
Moisture	3.5	27.22		
Ash	9.0	5.71		
HHV (btu/lb)	13080	8772	21800	

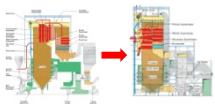


Gas Conversion Fundamentals

Typical Flue Gas Property Comparison

@ constant excess air

% by wt.	Bituminous	PRB	Natural Gas
O ₂	2.92	2.80	2.98
CO ₂	21.34	21.42	13.01
N	70.48	67.59	72.41
H ₂ O	4.91	8.12	11.60
SO ₂	0.35	0.07	0.00
Specific Heat	0.272	0.278	0.286

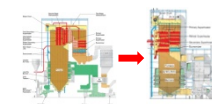


Gas Conversion Fundamentals

Typical Efficiency Comparison

(Constant X-Air and AH Outlet Temps)

	Bituminous	PRB	Natural Gas
Losses (%)			
Dry Gas	4.82	4.78	4.20
Water from Fuel	4.07	7.83	10.62
Moist in Air	0.11	0.11	0.11
Unburned Combustible	0.30	0.15	0
Radiation	0.17	0.17	0.17
Unaccounted For	1.50	1.50	1.00
Total Losses	10.97	14.54	16.10
Boiler Efficiency	89.03	85.46	83.9



Gas Conversion Fundamentals

Other Performance Parameters

	Bituminous	PRB	Natural Gas
Fuel Input	Base	1.05x	1.08x
Air Wt.	Base	1.04x	0.98x
Gas Wt.	Base	1.08x	0.96x
FEGT	Base	+50-100F	+30F
Surface Effectiveness			
Furnace	Base	Base	1.08x
Convection	Base	(.8-.95)x	1.2x

