Worldwide Pollution Control Association

WPCA/TVA

Coal & Gas Seminar

August 24, 2016

Visit our website at www.wpca.info

WPCA-TVA Coal & Gas Seminar August 2016-Tim Stark

Key Industries Served

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Gas Turbine Inlet

- Energy & Electric Utilities
- Oil & Gas
- Ship Propulsion

Industrial Filtration

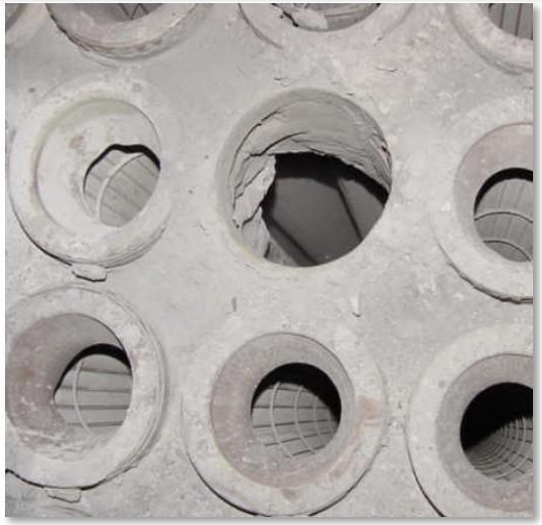
- Abrasive Blasting
- Carbon Black
- Cement
- Chemical & Pharmaceutical Manufacturing
- CNC Machining
- Coal-Fired Boilers
- Cold Heading
- Die Casting
- Food Processing
- Lime
- Metals
- Metalworking
- Plasma & Laser Cutting
- Plastics Processing
- Thermal Metal Spraying
- Waste-to-Energy
- Welding
- Woodworking

Specialty Membrane

- Automotive
- Microfiltration
- Packaging
- Medical
- Outdoor, Backpacking, Hiking, Snow Sports, Cycling, Running, Lifestyle, Workwear, & Military

Reverse-Air

Pulse-Jet



Pleated Element Technology

Baghouse Refurbishment

Estimated price off-line 500 MW boiler bag change out:

Pulse Jet: $1.2 to $1.8 million installed

Reverse air: $1.0 to $1.25 million installed

Filter bag replacement is the highest bag house maintenance cost

TWO PRIMARY FABRIC FILTER CONCERNS

EMISSIONS!

and/or

DIFFERENTIAL PRESSURE!

Six Ways Dust Gets to Clean Air Side of Baghouse

1. Hole in bag
2. Filter tubesheet connection point
3. Housing breaches/by-pass damper leakage
4. Cleaning too soon/often
5. Not cleaning
6. Air leaks at door seal

Common Upsets Causing Fabric Filter DP Issues

Upset Condition	Fabric Filter Effects
Tube leaks	High pressure drop from moisture carry-over, leading to constant cleaning
Material handling system failure	High hopper levels leading to high pressure drop from re-entrainment and filter abrasion/failure-also potential for heat excursion from hopper fires
Cleaning system failure	High pressure drop
Dew point excursions from pre-fabric filter equipment failure	High pressure drop from moisture condensation and chemical degradation of fabric/premature corrosion of support cages in pulse-jet-style units
SCR system upsets leading to high ammonia slip	High pressure drop from sticky dust created by ammonia levels, leading to constant cleaning
Fire suppression system failure	High pressure drop from moisture carry-over, leading to constant cleaning

Fabric Characteristics & Suitability for Power Generation Applications

	Polypropylene	Polyester	Acrylic	Fiberglass	Aramid	PPS	P84 ***	Teflon® ***
Max. Continuous Operating Temp.	170° F (77° C)	275° F (135° C)	265° F (130° C)	500° F (260° C)	400° F (204° C)	375° F (190° C)	500° F (260° C)	500° F (260° C)
Abrasion	Excellent	Excellent	Good	Fair*	Excellent	Good	Fair	Good
Energy Absorption	Good	Excellent	Good	Fair	Good	Good	Good*	Good
Filtration Properties	Good	Excellent	Good	Fair	Excellent	Excellent	Excellent	Fair
Moist Heat	Excellent	Poor	Excellent	Excellent	Good	Good	Good	Excellent
Alkaline Dust	Excellent	Fair	Fair	Fair	Good	Excellent	Fair	Excellent
Mineral Acids	Excellent	Fair	Good	Poor**	Fair	Excellent	Good	Excellent
Oxygen (>15%)	Excellent	Excellent	Excellent	Excellent	Excellent	Poor	Excellent	Excellent
Relative Cost	$	$	$$	$$$	$$$$	$$$$$$	$$$$$$	$$$$$$$

** Sensitive bag-to-cage fit*

*** Fair with chemical or acid-resistant finishes*

**** Must oversize bag for shrinkage for temperatures above 450°F (232°C)*

Case Study: Power Plant

Challenge	**2001: Start-up with initial installation 16 oz. OEM filter bags—PPS filter media with PTFE surface coating. After 3 years, differential pressures up to 10” experienced with little recoverability, which resulted in the boiler being de-rated**
Solution	**2004:** Installation of new filter bags —15.5 oz. proprietary PPS filter media with ePTFE membrane laminate (BHA Preveil)
Results	**2004-2010:** **Operational improvements since installation of new BHA Preveil filter bags** • Filter life improved from 3.5 Years to 5+ years • Pulse cleaning pressure reduced from up to 100 psi to 75 psi • Substantial reduction in pulse cleaning frequency • System averaged 6” to 7” pressure drop • Met PM-10 emission rate of 0.018 lb/MMBtu **Upsets overcome since installation of new ePTFE filter bags** • High hopper levels • Cleaning system turned off • Flooded the baghouse due to broken fire header • Ammonia slip upwards of 10 ppm

Questions?

Thank you.