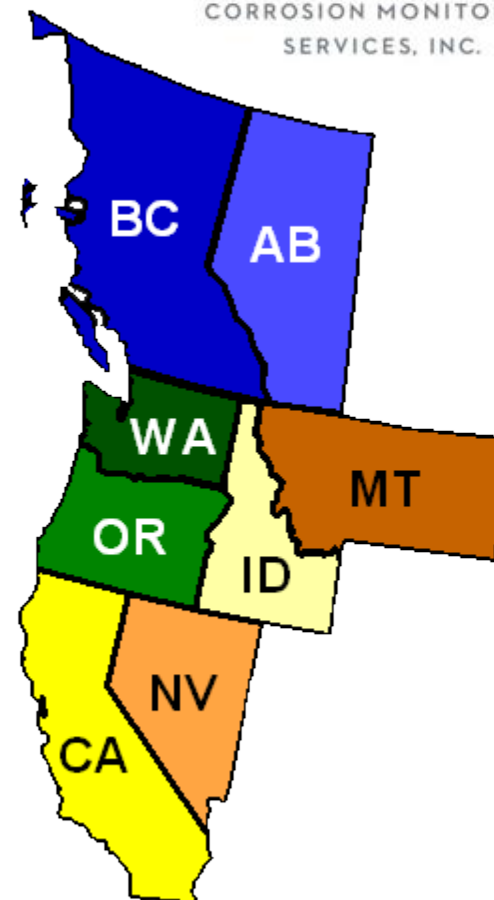




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CORROSION MONITORING





- CMS
- Established 1985
- The only company solely dedicated to tubular air heater inspection and repair in the country
- 60 jobs a year
- 115 units inspected a year
- ~ 20 Million in sales per year for the last 5 years
- Just acquired a safety company to add to the CMS brand

- Two types of air heaters
 - Regenerative / Baskets
 - Tubular
 - Vertical
 - Horizontal
- The paper industry and waste to energy industry
- Power Electric facilities
- Chemical plants

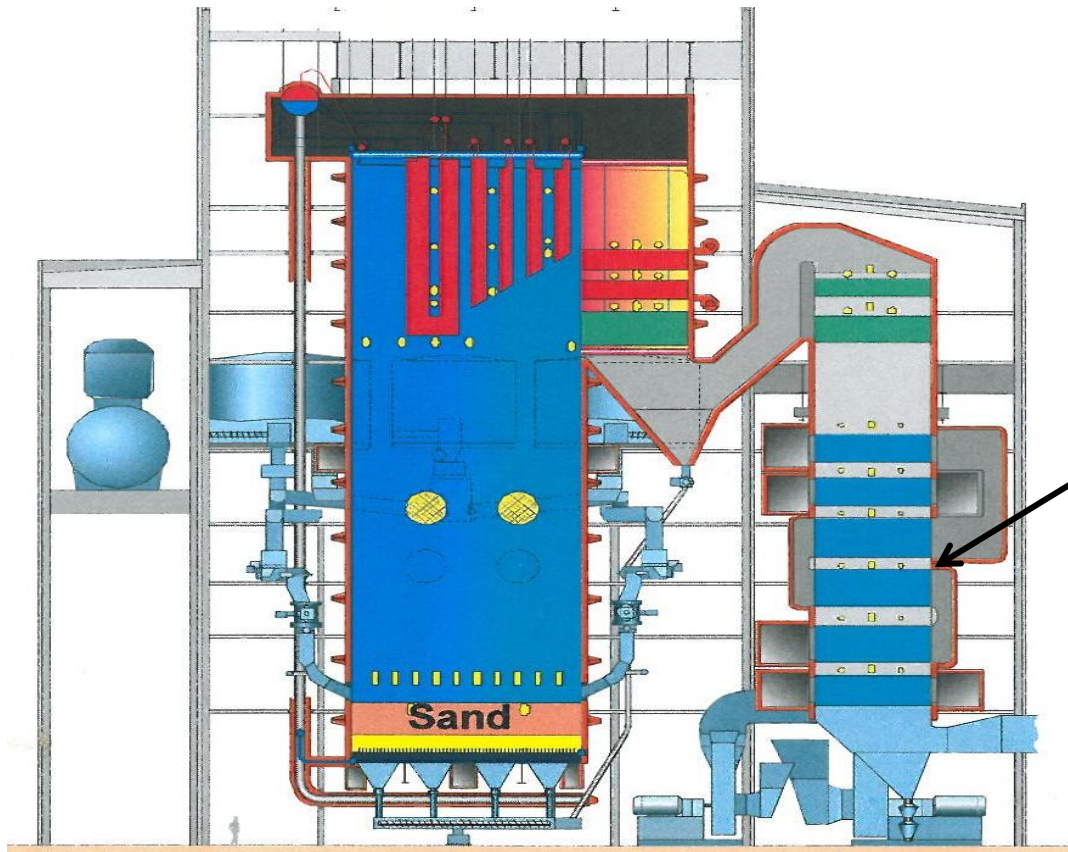


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- Failure mechanisms
 - Erosion
 - Corrosion
 - Mechanical damage



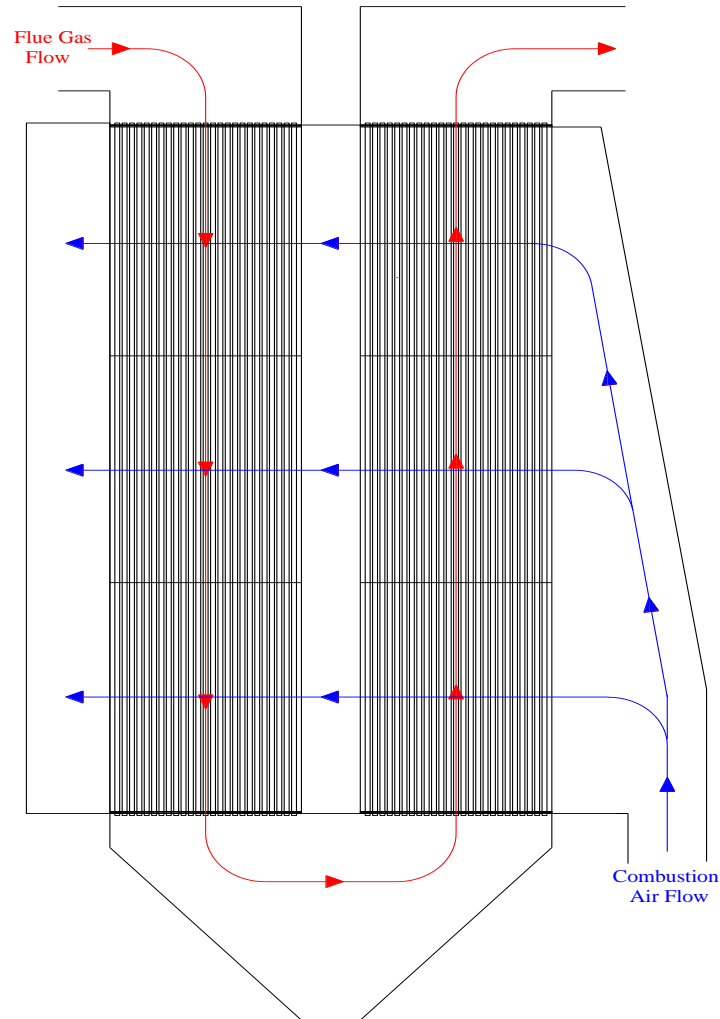
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Tubular air heater in
most CFB boilers in
service today.



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- Dew Point corrosion:

B&W Steam/its generation and use, 41st Edition

Air heaters used on units firing sulfur bearing fuels are subject to cold end corrosion of heating elements and nearby structures. In a boiler, a portion of the sulfur dioxide (SO_2) produced is converted to sulfur trioxide (SO_3) which combines with moisture to form sulfuric acid vapor. This vapor condenses on surfaces at temperatures below its dew point of 250 to 300F (121 to 149C).

- What does it look like?
- Where does this happen?

What does it look like?





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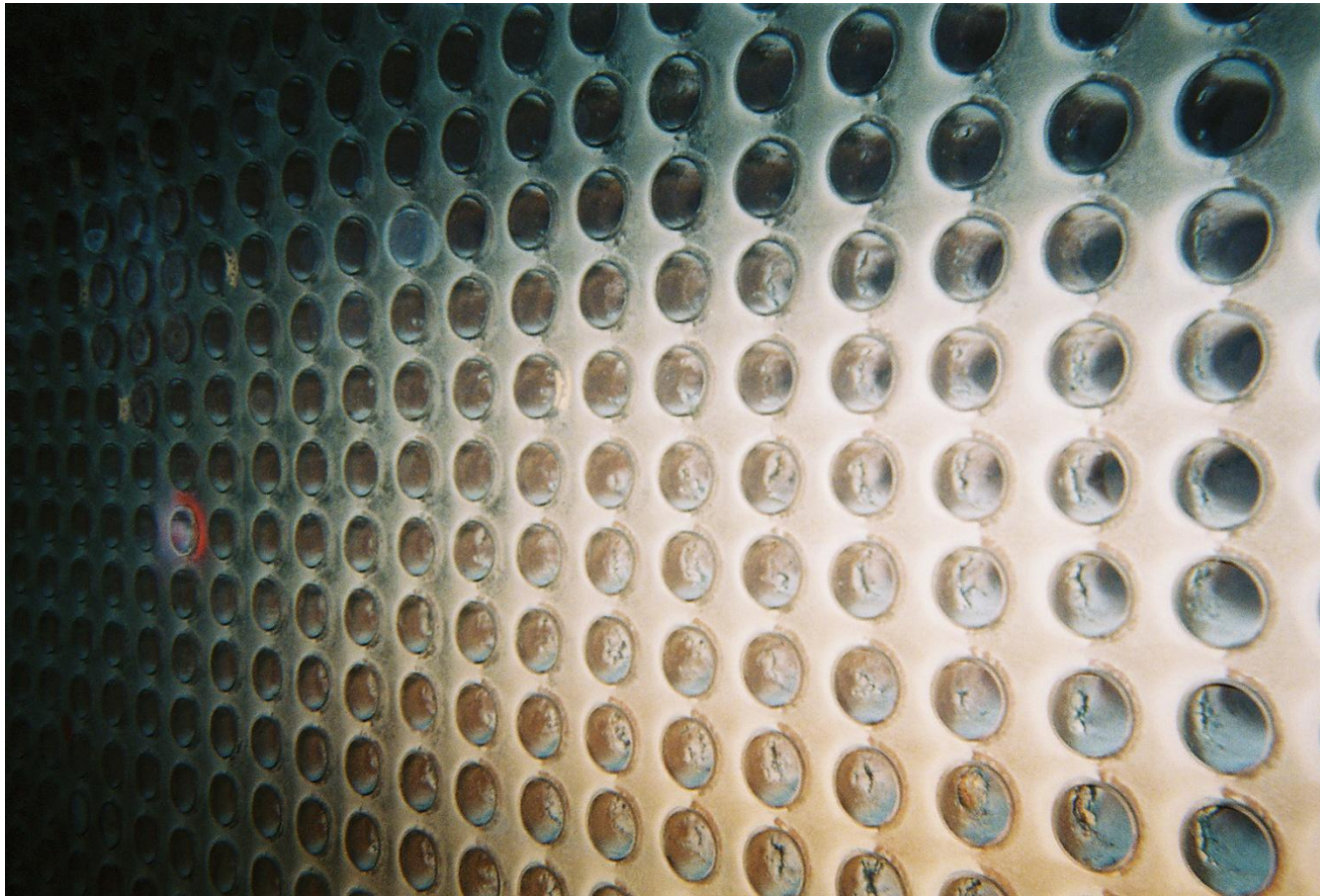


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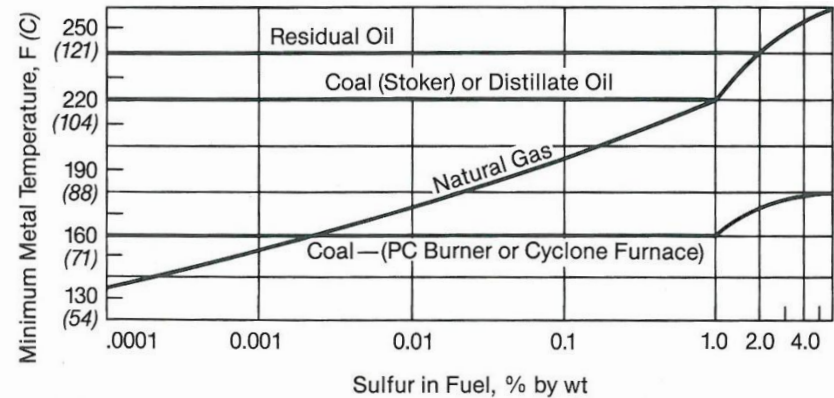
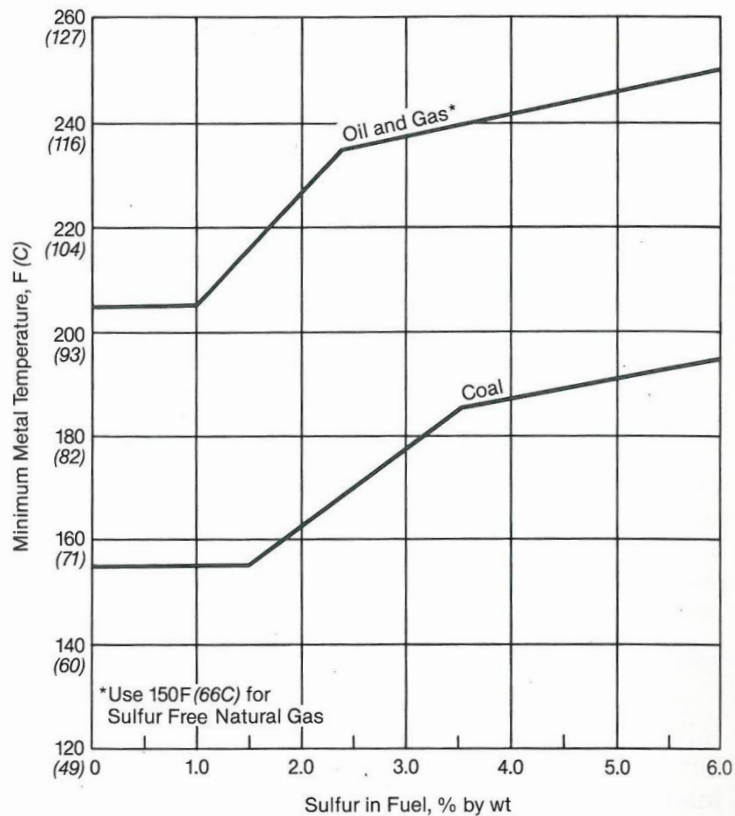




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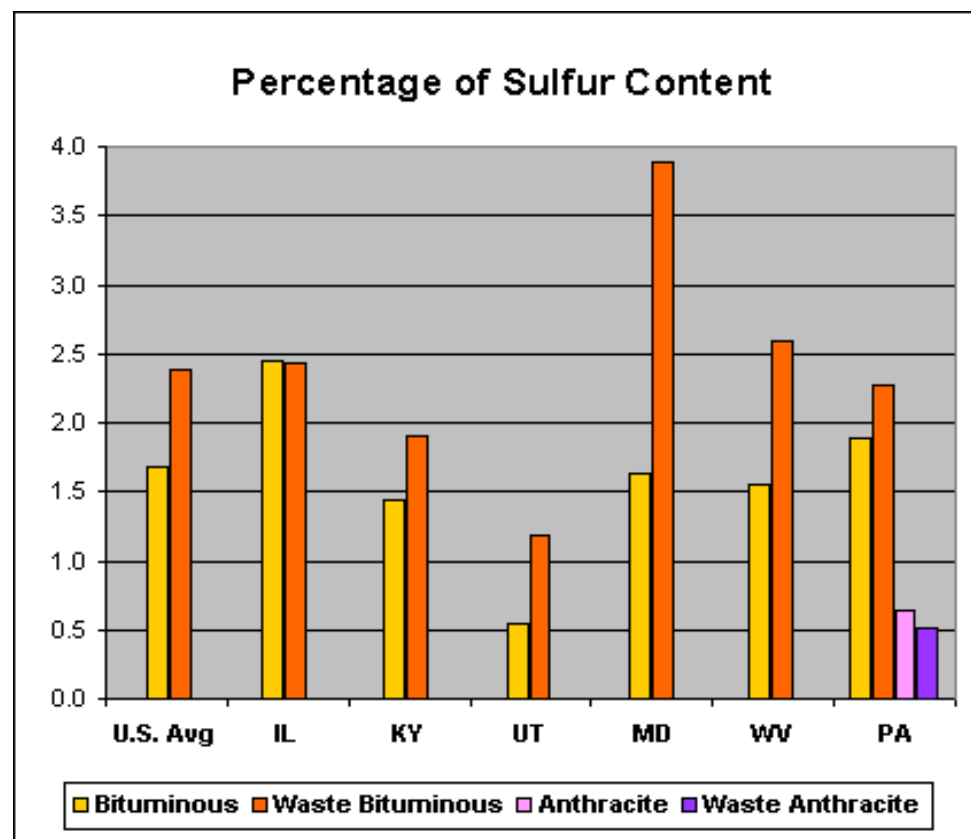
Corrosion Determinations



B&W Steam/its generation and use, 41st Edition



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Operators an owners



- Questions to ask yourself
 - What is your sulfur/chloride/corrosives in the fly ash content?
 - Steam coil pre heaters?
 - Flue gas exit temperatures?
 - What are you burning?
 - What is condensing and where?

CMS's corrosion fix



- Patent pending insulated tube sheet with the convective tube.
- Pre-determined thickness of insulation
- Pre-determined length of convective liner with multiple expansions.* The way and where the expansions are made are critical.



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- Financial impacts

Testimonials



- “We had a severe dew point corrosion issue at our inlet tube sheet in our CFB boiler’s tubular air heater for years. We had to replace our tubes every 2 years. CMS recommended installing their convective tube and insulated inlet tube sheet solution. It’s going on 6 years now and we have yet to perform any maintenance on this unit. On top of that, CMS worked extremely safe and were wonderful to work with. I’d recommend CMS and their services to anyone in the industry.”

Interstate Paper

“We had CMS put in their convective tube solution in one of our CFB air heaters. This repair has help up for 5 years and saved us hundreds of thousands in typical maintenance. We were so pleased with their work ethic and safety we had the same repair done in our other CFB unit. Both their repairs are holding up “as new” and we are happy to refer CMS to anyone”

University of North Carolina at Chapel Hill

“Since we did our repair we have made 1.5 million in added revenue from lower fuel demand and less load on the fans. We look forward to working with them at the next upcoming outage”

Clearwater Paper



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- Questions???