

SUCCESS STORY

Fluidized Bed Boiler Tubes



Kennametal infiltration brazed cladding measured by eddy-current revealed thickness loss, in a localized area, in line with a catalyst injection nozzle at 0.002; remaining clad area had no measurable coating thickness loss.

PLANT SPECIFICATIONS

- Produces 9 billion kilowatt-hours of electricity annually.
- Consumes 12,000 tons of blended coal daily.
- 10 coal-fired boilers.
- 160MW Unit 10 was the nation's first commercial scale atmospheric fluidized bed combustion boiler.
- Unit 10 predominantly burns high sulfur coal from Illinois.
- Evaporator area for unit 10 utilizes SA210-1, 57.15mm OD x 5.59mm wall internal rifled tube.
- Units 1–9 utilize low NOx burners.
- Unit 1 is evaluating selective non-catalytic reduction technology.



THE CHALLENGE

- Original unit 10 bubbling fluidized bed boiler tubes supplied with 1mm induction fused 15Cr, 4.5Fe, 4Si, balance Ni spray coating.
- Uninterrupted service life expected five years.
- After two years service, unit experienced tube leaks due to spray coating erosion failures.
- Reoccurring forced outages due to tube leaks.
- Spray coating failure due to poor erosion resistance, and coating disbonding, exposing tube base material.



THE RESULT

- Three alternative tube protection materials installed in unit 10 for evaluations: high chrome weld overlay 0.140" thick, thermal spray 0.040" thick, and Kennametal infiltration brazed cladding 0.030" thick.
- Two-year service exposure resulted in coating failure of the weld overlay and the thermal spray required the removal of test sections.
- Kennametal infiltration brazed cladding measured by eddy-current revealed thickness loss, in a localized area, in line with a catalyst injection nozzle at 0.002; remaining clad area had no measurable coating thickness loss.
- Fluidized bed tube life estimated at 15+ years of service life.

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