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## Demonstrating operational stability and high returns on investment using additives in biomass burning power boilers

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Most steam/power producing facilities burning solid fuels encounter slagging, fouling, agglomeration, or corrosion at some point in the life of their units. These effects are a direct result of fuel chemistry and producers are often tied to a fuel. The fuel may be a waste from another on-site process (i.e. stripped bark from a paper mill), a contractual obligation, or a requirement to receive subsidies. In addition to inefficiencies and burdensome cleaning schedules, producers may also have to tolerate frequent unplanned outages; all of which can add up to significant financial loss. Aurora is a portfolio of engineered additives formulated to address the problematic components of ash in solid fuels. Depending on the furnace design and issues faced, the additive may be blown into the furnace or applied directly to the fuel prior to entering the furnace, to optimize performance in problematic areas. The additives are aluminosilicate blends that preferentially react with volatile alkalis (sodium and potassium) at standard furnace temperatures to form higher melting point compounds. This decreases the abundance of molten phases, and lowers the potential for deposits and agglomerates to form. Another mechanism of the additive is to infuse non-cohesive layers between deposited particles, acting as a mechanical barrier which limits densification and eases removal. As a consequence of decreased deposit build-up on tube surfaces, corrosion is significantly reduced. Two recent success stories using Aurora in biomass boilers will be presented: Boiler rating: 2x12.5 steam tons per hour furnace configuration: Grate stoker with fire-tube boiler Fuel: Municipal waste and wood blend main challenges: Superheater fouling and deposition in fire tubes; Boiler rating: 450 steam tons per hour furnace configuration: Circulating fluidized bed fuel: Bark and petcoke blend main challenges: Unstable operation and loop seal plugging.

### Biography

Adam Campen joined Imerys as a Combustion Engineer in 2014. His experience with fuel additives covers a wide range of solid fuels and furnace configurations. Adam has a Master's degree in Mechanical Engineering and a PhD in Engineering Science from Southern Illinois University, where he researched coal and biomass gasification, synthesis gas processes, and fly ash utilization.

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