

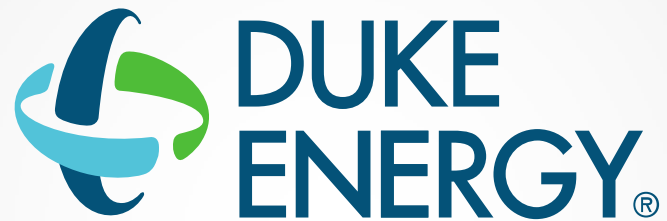
REINHOLD ENVIRONMENTAL Ltd.



2016 NO_x-Combustion-CCR Round Table Presentation

February 1 & 2, 2016, in Orlando, FL / Hosted by OUC

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Infra-Red Camera Applications Supporting Fuel Flexibility

Stephen Dean, Strategic Engineering, Duke Energy

Duke Energy Fuel Flexibility

- Coal units designed to burn low ash, high ash softening temperature coals can be challenged to burn ILB & NAPP region coals
- FEGT, chemical addition to adjust ash fusion temperatures, diligent maintenance practices of sootblowers and instrument calibration, along with consistent fuel blending all become critical to successful operations
- Asheville, Allen, Marshall, Belews Creek, Roxboro & Mayo are all stations in NC being challenged with Fuel Flexibility

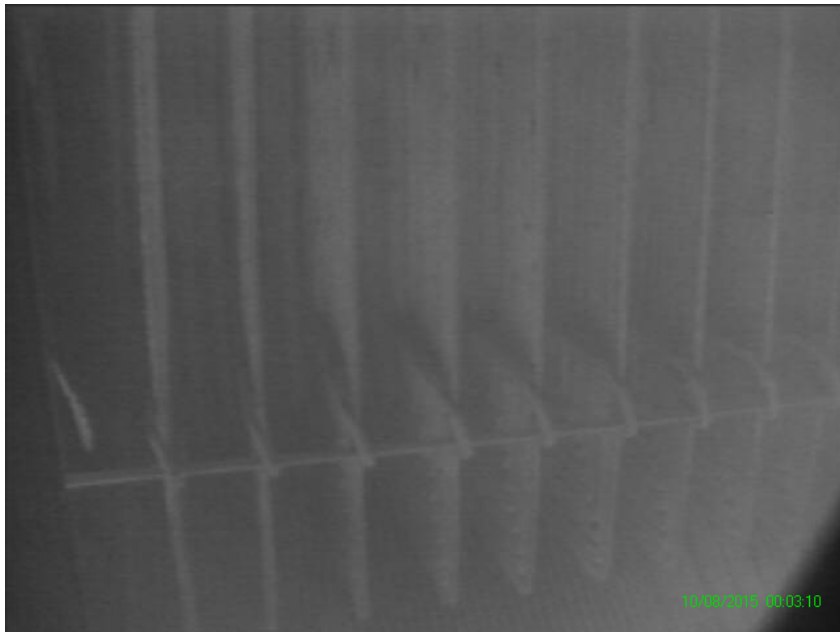
Duke Energy Fuel Flexibility

- Visual inspection through available viewports has always been a reliable way for operators to monitor ash build-up in their units
- Ash build-up where furnace pendants bridge can happen quickly leading to reduced thermal performance and channeling of flue gas/flyash and tube wall loss



Fuel Flexibility + IR Cameras

- Visual inspections of ash build-up can be difficult to see at high loads and dependent on viewport locations and inspector training.
- Infra-Red cameras see through the bright “shine” at high loads and are continuously available.



Fuel Flexibility + IR Cameras + Slag Index

- Initial use of the IR cameras in something other than a temporary hand-held application was during a chemical addition trial in Asheville, Fall 2015
- This was also the first time using the Slag Index tool
- Videos, compressed video's, Daily Slag Index trends along with the live video/SI feed from the data collection PC were all available throughout the 45 day trial
- IR cameras + SI provided an extra set of eyes on the suspected slagging regions of the furnace giving the test team and station management confidence in the chemical reduction trial

Fuel Flexibility + IR Cameras + Slag Index

- Future test burns will include the portable IR cameras with SI software
- Quantification of the slag build-up throughout the test, correlated with unit operating data and coal analyses, provided new insight to operations with chemical addition
- Permanent camera installation @ Belews Creek complete and functional

