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FLEXICOM-LNB

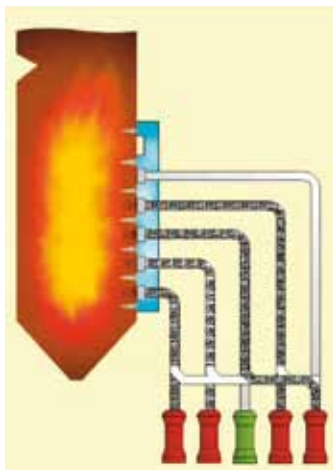
**Combustion Technology for Low
NO_x Operation and Improved Boiler
Performance**

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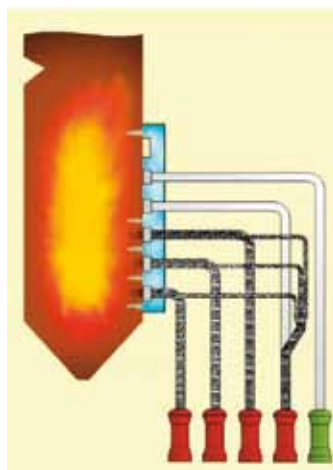


General overview

- FLEXICOM-LNB: ability to regulate burner use for most favorable “in-furnace fire distribution”
- Continuous and steady combustion process operation can be maintained within a defined area avoiding unwanted scenarios promoted by the unavailability of mills, such as “burner gap” which leads to increased NO_x and carbon-in-ash
- Retrofit of the combustion system consists of mechanical changes in the pulverized fuel conveying system:
 - Substitution System: steady air/fuel supply regardless of mill in service (minimization of NO_x, CO, carbon-in-ash and heat rate, increased flexibility for mill maintenance)
 - Addition System: maximum stratification (minimum NO_x without the increase of flue gases temperature)



SUBSTITUTION



ADDITION

Applications

- Heat rate optimization by controlling steam and flue gas temperatures and minimizing carbon-in-ash
- NO_x reduction through application of enhanced combustion conditions (without detrimental effects)
- Reduction of SCR/SNCR capital and operating costs:
 - Typical savings in capital costs: 6 - 8% (catalyst volume, reagent storage plant size)
 - Typical savings in operating costs: > 30% (catalyst replacement, NH₃ reagent consumption)
- Optimization of boiler/milling system availability, operation flexibility and maintenance
- Fuel use optimization: poor quality or difficult fuels, co-firing
- Increased potential for NO_x reduction through reburning and ammonia/urea injection
- Cost-effective reduction of mercury emissions by means of improved combustion tunings



Competitive advantages

- Cost-effective solution for NO_x reduction compatible with enhanced process safety, availability and efficiency
- Maximum fuel and air stratification avoiding increases in carbon-in-ash, radiant SH surface temperature, SH steam temperature, flue gas temperature
- Parallel increase in boiler and milling system operating flexibility
- Versatile technology to simultaneously address different targets: heat rate, emissions and/or operational constraints
- System design and start-up under NFPA-85 regulations
- Short boiler outage



Typical ROI periods as low as 1 – 2 years



Executive summary

- FLEXICOM-LNB, retrofit of coal pipe layout to:
 - Reduce SCR/SNCR capital and operating costs
 - Improve heat rate and minimize carbon-in-ash
 - Minimize NO_x emissions by primary measures (fuel and air staging)
 - Enable the use of lower quality fuels
 - Control mercury emissions
- NO_x generation and combustion efficiency unaffected by change of mills in operation
- Avoidance of typical fuel and air staging collateral problems such as increased carbon-in-ash, corrosion, steam and tube temperatures, flue gas heat losses, etc.
- Advantages of implementing FLEXICOM-LNB:
 - Cost-effective solution for NO_x reduction
 - Improved overall performance and operating flexibility and safety
 - Versatile application to multiple objectives





Our clients

GAS AND ELECTRICITY

Abelló Linde - AGA - Air Liquide - Alstom - BP Solar - CENER - CFE - Colbún - E.ON - EDF - EDP - Elcogas - Emgesa - Enagas - Endesa - Endesa Ireland - EnergieKontor - E.ON France - E.ON Italia - EVN - Gas Natural - GDF Suez - HidroCantábrico - Iberdrola - Intergen - Linde Gas - MedGaz - Pegop - Praxair - Promigas - PKE Polska - Reganosa - Saggas - Scottish Power - Viesgo

HYDROCARBONS

Agencia Nacional de Hidrocarburos de Colombia - Asociación Colombiana del Petróleo - Atofina - Baker Hughes - Bhp Billiton - BP - Cepsa - CLH - Conoco Philips - Ecopetrol - Exxon Mobil - Mansarovar Energy Colombia - Petro Santander Colombia - Petróleos de Venezuela - Petrolifera Petroleum - Petronor - Repsol - Sonatrach

CHEMICAL AND PETROCHEMICAL

BASF - Biofilm - Brenntag - Brinsa - Dow Chemical - ENCE - Ercros - Erkol - Ferial - FMC Foret - Huntsman Tioxide - MAXAM - Mexichem - Oiltanking - Propilco - Rhodia - Solvay - UBE - Vordian

MINING

Bhp Billiton - Boliden - Catalina Huanca Sociedad Minera - Cerro Matoso - CLC - Glencore - Los Quenuales - Matsa - Perubar

CEMENT AND STEEL

Aceralia - Acerinox - Argos - Atlantic Copper - Cementos Portland - Cemex - Cimpor - EADS - Holcim - IZAR - Lafarge Asland - Malpesa - Titan America / Separation Technologies - UNESID - Xstrata Zinc - Zinsa

ENGINEERING COMPANIES AND INFRASTRUCTURES

Abengoa - Acciona - Conalvías - Duro Felguera - Elecnor - FCC - Fluor - Foster Wheeler - Gamesa - General Electric - Inabensa - Intecsa-Inarsa - Isolux Corsán - Lima Ingeniería y Construcción - OHL - Opain - Sener - Soluziona - Technip - Técnicas Reunidas - Vicon

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