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HIGH LEVELS OF BIOMASS CO-FIRING

Reducing Slagging and Fouling Constraints

PROJECT PROFILE 371

CLEANER FOSSIL FUELS PROGRAMME – CLEANER COAL R&D PROGRAMME

OBJECTIVES

The project aims to provide boiler operators with greater confidence in using higher levels of biofuel replacement (50% thermal or more). The specific objectives of the project are:

- Identification of the main areas of the boiler at risk if biomass is co-fired with coal at 50% or more of thermal replacement
- Determination of the nature of deposits likely to form in the radiant and convective passes of the boiler. Measurement of the physical and mechanical properties of the deposits to determine thermal shock and sootblowing properties
- Development of a model to predict the thermal impact of fouling deposits and to optimise sootblowing operations
- Assessment of the use of low cost additives to mitigate the effects of alkali metal fouling from biomass residues
- A technical and economic assessment of the viability of high levels of biomass co-firing, including recognition of current CO2 abatement levels and other environmental constraints

SUMMARY

The increased use of biomass, a fuel that is seen as largely CO2 neutral, in power generation is one of the few ways in which the power industry could make a significant step to reducing CO2 emissions. Co-fired boiler trials have been encouraging and have shown that small amounts of coal can be replaced by biofuels without undue impact on boiler performance. However, in order to make a real impact towards reaching Government targets, the amount of biomass for co-combustion would have to be greatly increased.

Figure 1. Example of slag build-up in a power station boiler

Biomass fuels vary enormously in both their combustion properties and ash characteristics. This project will focus on those biofuels that could be made available in substantial quantities. It aims to provide industry with clear guidelines as to those areas of the boiler that would be most at risk from increased levels of slagging and fouling as the biomass replacement was increased. Thus leading to improved understanding of the nature of the deposits and allowing the development of an on-line model to predict the thermal impact of such deposition allowing the operators to optimise their sootblowing operations.

The project will also provide valuable information on the use of low cost additives to mitigate the impact of fouling deposits. Should colliery washings or high-carbon content pulverised fuel ashes prove effective then this would provide a means for disposal of materials for which there is no current market.

Finally, a techno-economic study will aim to highlight the cost options and scenarios needed to make investment in large volume biomass co-combustion a reality.

COST

The total cost of the project is £450 000 with the Department of Trade and Industry contributing £220 000.

DURATION

24 months – January 2005 to January 2007

LEAD CONTRACTOR

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