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TOWARDS ZERO EMISSIONS FROM COAL FIRED POWER PLANT

NO_X and Mercury

PROJECT PROFILE 366

CLEANER FOSSIL FUELS PROGRAMME
- CLEANER COAL R&D PROGRAMME

OBJECTIVES

The overall aim of this project is to investigate and develop an integrated, multi-pollutant control approach that targets major reductions in NO_X and mercury emissions from coal-fired plant. The specific objectives of the project are:

- To develop a stage-wise NO_X reduction approach that will enable coal-fired utility boilers to achieve a target of 200 mg/Nm^3 or better in the most cost-effective manner.
- To assess of the combined performance of primary and secondary NO_X control measures including particulate control devices and quantify their impact on flue gas mercury concentration and speciation during coal combustion.
- To investigate the suitability of a range of approaches to the removal of mercury from flue gas (combustion modifications, sorbents, additives etc) and to determine the effect of fly ash properties and flue gas chemistry on mercury behaviour.
- To develop an integrated multi-pollutant control approach with potential for future application to UK coal-fired power plant (and coal-fired power plant worldwide).

SUMMARY

Increasing environmental concerns regarding the use of pulverised coal for power generation continue to drive legislation that limits the emissions of pollutant gases to the atmosphere. The current European Union Large Combustion Plant Directive calls for significant reductions in NO_X, SO_2 and particulate emissions from coal-fired power plant over the next few years. Primary NO_X control measures such as low NO_X burners and air staging and secondary (post-combustion) NO_X control measures such as NOxStar™ or SCR, in combination, should provide

Figure 1. General View - NO_X Reduction Test Facility (courtesy of Mitsui Babcock Energy Ltd

the potential for significantly higher overall NO_X reductions to meet the most stringent emission limits in a more cost-effective manner than a stand-alone technology for the same level of NO_X control. Further, over the past decade there has been increasing concern around the world regarding the impact of mercury on human health and the environment. It is clear that future, more stringent limits for NO_X and mercury will lead utilities to seek greater versatility from existing NO_X controls and/or new ECTs that they plan to install, while at the same time reducing costs. It is therefore critical to develop a better understanding of the chemical and physical processes that will enable the combined capture of these pollutants either directly or by altering the flue gas chemistry. The current project targets the development of a hybrid process for significantly reducing both NO_X and mercury emissions. A stage-wise approach is being applied that seeks to gain a better understanding of the chemical and physical processes involved in the capture of the pollutants, leading to the development of an integrated, multi-pollutant strategy for meeting emission legislation in the most cost-effective manner.

Further information on the Cleaner Fossil Fuels Programme, and copies of publications, can be obtained from:
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COST

The total cost of the project is £954,101 with the Department of Trade and Industry contributing £477,050.

DURATION

24 months - October 2004 to November 2006

LEAD CONTRACTOR

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DTI/Pub URN 05/960