Expert systems and coal quality in power generation, CCC/186

Abstract

Coal quality, that is the properties of coal, has an impact on many parts of a power plant including the coal handling facilities, pulverising mills, boiler, air heater, ESP, ash disposal as well as stack emissions. Coals have different characteristics and heat content. The behaviour of a coal in a boiler is strongly influenced by its rank and by the mineral matter and other impurities associated with it. Coal properties can affect the efficiency, reliability and availability of both the boiler and the
emissions
control units. Therefore they affect the economics as well as the short- and long-term operation of the plant. Expert systems are used today in many aspects of power generation. The first step in the application of expert systems for coal quality assessment is to ensure that the sampling procedures used are as accurate and precise as is possible. This then provides a representative sample for the subsequent analysis. Online analysers can show variations in coal quality as they are occurring.

However, online analysers can be expensive and their cost-effectiveness depends on the site and application. Despite questions about the accuracy of online analysers being raised, their use in coal mines as well as power plants continues to increase. The operation of coal-fired power plants involves multiple variables which have different levels of importance. A key contributor to an overall expert system is the method used to optimise the coal combustion in the boiler. This is affected by coal quality, boiler cleanliness and equipment deterioration as well as by the even distribution of the pulverised fuel to the burners. Expert systems for assessing coal quality and its implications for power generation have been and continue to be developed.