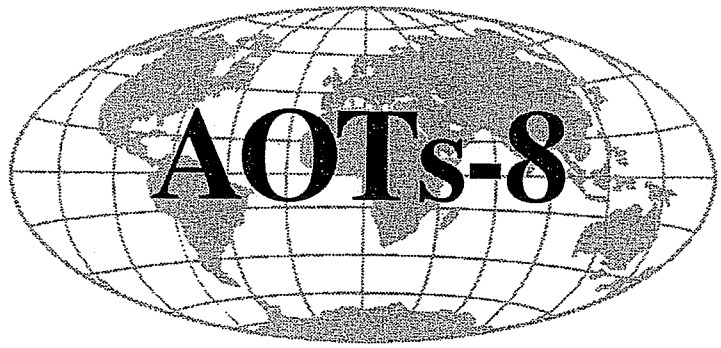

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ABSTRACTS

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DEVELOPMENT OF RADICAL INJECTION DE-NOX PROCESS FOR COAL-FIRED BOILERS

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In Japanese power station, most of the steaming coal has been imported from various coal producing countries such as Australia, United States, China, Indonesia, South Africa, Russia and Canada. Since it is required to burn a wide variety of potential imported coals, more than 50 different coals, in a single boiler, evaluation of acceptability of such unfamiliar coals is one of the most critical issues.

Another key issue is to meet emission regulations. NOx, SOx and particulates emission from coal power station have already regulated. It is severe NOx regulations in particular. Current NOx reduction in coal-fired boilers has been reduced by two-stage combustion with low NOx burners and de-NOx equipments such as SCR. When a wide variety of coal is burned in the boiler, minimum NOx level at the boiler exit is more than 100 ppm, and the NOx level at SCR exit is usually more than 15 ppm. In the future, more less NOx and less cost are needed. Therefore it is important to develop advanced NOx reduction equipments.

In this study, a new concept of NOx reduction is proposed for coal-fired boilers. Our unique technique is to obtain high efficiency NOx reduction by key radical injection into a furnace. Effective radical species for de-NOx, NH and NH_2 radicals, are produced by dielectric barrier discharge. Some de-NOx methods by plasma process were already reported, but no studies have ever tried to inject directly produced radicals into a furnace.

The optimum plasma conditions were established by some fundamental experiments. 99.5% NOx reduction was achieved under NH_3/NO mole fraction is 1.2. Current results and future work in this study are summarized in conference.