

## **Analysis of the Water Moisture Influence for Plume Opacity after a Wet Flue Gas Desulfurization (FGD) Scrubber**

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Generally, Opacity is only consider the mass concentration of particulate matters emission at a coal-fired power plant, but after installed a wet flue gas desulfurization (FGD) scrubber to remove the SO<sub>x</sub>, additional spray water of the nozzles with exhaust gas scavenging so that the exhaust gas would be saturated with water moisture (under water dew point temperature) at 49-52 Celsius degree. When the exhaust gas of coal-fired power plant from Electrostatic Precipitator (ESP) into FGD unit, the water vapor of exhaust gas saturated became the water moisture and would affect the in-stack plume opacity measurement. From the literature review, two very important factors affect in-stack plume opacity are conducted—light extinction of particle emission and water moisture content after a flue gas desulfurization (FGD) unit. The mass light extinction coefficient for water moisture is conducted for experimental method by using Beer's law with minimum least square method. In this study, In order to give various data for mass concentration of water moisture with plume opacity, we adjust a wet FGD pre-cooling and circulating water flow rate to give data and all data with 95% confidence interval boundaries, In addition, exhaust gas temperature and water relative humidity coefficients are also conducted for water moisture extinction factors. The experimental results show that the water moisture affect the plume opacity near from 7.1% to 8.8% when the mass concentration of water moisture from 72.6 to 97.8 g/Nm<sup>3</sup> and water relative humidity from 66.5% to 96%. In addition, decreased the exhaust gas temperature or increased the flue gas humidity condition will increase plume opacity measurement.