

WHITE PLUME REMOVAL USING FUEL ADDITIVES IN THERMAL POWER PLANTS**B.K. Lee¹, S.W. Cho², S.K. Jeon²**¹*Civil and Environmental Engineering, University of Ulsan, Ulsan, Korea*²*Environmental Management, Korea East-West Power Co., Ltd, Ulsan, Korea*

Flue gas desulfurization (FGD) facilities have been operated to reduce the air emissions of sulfur oxides in many thermal power plants. Even though they satisfy the strict air emission standards in terms of sulfur oxide concentrations, power plants that use heavy oil, having high sulfur content, as fuel have been troubled with their visible plume opacity such as white plume. The general public who live near the power plants has complained about the plume opacity from the power plant stacks. In this study we investigated causes of the white plume produced from the thermal power plants in Ulsan, Korea. Fuel additives, containing magnesium slurry and emulsifiers, were injected into the burner systems of the boilers to remove the white plume from the stacks. The average temperature of the cold end section in the air pre-heater maintained below the acid dew point of sulfuric acid. Significant emission reduction of SO₃ in the flue gases by injecting fuel additives resulted in successful removal of the visible white plume. In addition, the combustion characteristics and thermal efficiency of the boilers have been significantly improved. The catalyst operation temperature, flue gas temperature and excess air volume significantly reduced. Finally, we solved the complaints concerning the visible white plume and also saved a large amount of the power plant operation costs through improvement of thermal efficiency of the systems and improvement of the combustion efficiency of the boilers.