

Real-time Monitoring of SO₃/H₂SO₄/NH₃ in SCR Outputs

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The Electric Power Research Institute (EPRI) has developed techniques for real-time, in-situ monitoring of SCR outputs using optical systems. This technique allows for monitoring of NH₃, SO₃, and H₂SO₄ in addition to more conventional compounds like HCl, NO_x, SO_x, CO, CO₂ and H₂O. To perform these measurements, it was necessary to overcome heavy particulate loading in the duct. To do this, EPRI developed with the University of California a custom probe which discriminates against particulates while allowing free gas flow. Preliminary tests of the probe indicated particulate reductions in excess of 80%. With this reduction, long path infrared measurements will be possible in power plant ducts for the first time. Phase I of the program was conducted in August of 2005 at the Hoosier Energy Merom Station. The beam path was at the output of the SCR and traversed a 32 foot duct perpendicular to the gas flow. Data was collected with a Fourier Transform Infrared (FTIR) system monitoring 13 compounds including SO₃, H₂SO₄, NH₃, and HCl. The data clearly demonstrated the ability of the probe to reduce particulate loading in the measurement path, allowing for in-situ measurements. Phase II of this program has just begun. This phase is being conducted at the TVA Widows Creek facility. The objective of this phase is to test the long term operation of the probe and of the FTIR analyzer while operating in harsh environments. This test is expected to last 30 to 60 days with the equipment operating essentially unmanned.