



In applications where nitrogen oxides (NO_x) removal is not required, Powerspan's ECO[®] technology is installed without the NO_x control component. Our resultant ECO-SO₂ absorber installation achieves major reductions in emissions of sulfur dioxide (SO₂), oxidized mercury, and fine particulate matter (PM_{2.5}). This process also produces a valuable ammonium sulfate fertilizer co-product that is ready for sale to the fertilizer market.

- 1 Flue gas from a coal-fired boiler passes through an electrostatic precipitator (ESP) or fabric filter to remove the majority of particulate matter.
- 2 In the lower section, spray nozzles distribute droplets of ammonium sulfate (AS) liquid into the flue gas. Water evaporates from the AS solution, saturating and cooling the flue gas, as well as concentrating the AS co-product.
- 3 The recycle pump circulates the AS liquid back to the spray headers, with a bleed stream to the co-product processing system.
- 4 In the upper scrubbing section, sulfur dioxide (SO₂) is absorbed into the ammoniated solution. The absorber packing enhances the gas to liquid interface.
- 5 After exiting the upper scrubbing section, the flue gas enters a wet electrostatic precipitator (ESP). Aerosols, air toxics, and fine particulate matter are captured here and returned to the lower scrubbing section.
- 6 Scrubbed flue gas, essentially free of SO₂, oxidized mercury, and particulate matter, exits to the wet stack.
- 7 The scrubbed SO₂ is in the form of SO₃, sulfite. Air is injected to oxidize sulfite to sulfate, similar to a limestone-forced oxidation system.
- 8 The clear, liquid ammonium sulfate (AS) stream, which contains dissolved AS salts, oxidized mercury, and captured particulate matter, is sent to a filtration system that filters out ash, insoluble metals, and captured mercury.
- 9 The treated AS co-product stream, free of ash and mercury, can be sold in liquid form or sent to a crystallizer to produce crystals of the required size for sale into the fertilizer market.
- 10 Make up water is periodically used to rinse the walls of the wet ESP and replenish the water lost to evaporation.
- 11 Ammonia reagent is added to maintain process chemistry conditions that result in a high SO₂ scrubbing rate.