

UTILIMAG[®] 40

Application of UtiliMag[®] 40 Magnesium Oxide to Solve SCR Problems

The coal-fired utility industry must comply with new discharge regulations for nitrogen oxide (NO_x). The most promising method to obtain the required NO_x limits is by use of Selective Catalytic Reduction (SCR).

Through the use of SCR technology, NO_x emissions are reduced to desirable levels, but there are problems with this technology. With the addition of an ammonia slip into the gas flow through the SCR unit, ammonium bisulfate is formed from the reaction of the ammonia and sulfur trioxide.



The resultant ammonium bisulfate contributes two major problems to the unit:

- Pluggage: Ammonium bisulfate melts at 297°F, and will be molten at typical SCR and air heater operating temperatures.
- Corrosion problems: Ammonium bisulfate (2% wt. solution) has an acid pH <1.4.

Lime (CaO) has been used to try to correct these problems, but results in additional problems. When lime is employed, it reacts with the ammonium bisulfate to form gypsum (CaSO₄ · 2H₂O).



This resultant gypsum contributes to the following problems:

- Pluggage: CaSO₄ · 2H₂O contributes to a hard, unfriable deposit in the unit.
- Low Solubility: CaSO₄ · 2H₂O has a low solubility (2 g/l) and cannot be washed off the unit surfaces.

When UtiliMag 40 MgO is injected in the SCR outlet, the problem of air heater pluggage is remedied. The MgO reacts with the ammonium bisulfate to produce ammonium magnesium sulfate (AMS).



The resultant AMS provides the following advantages:

- Friable Ash: AMS is solid at 750°F and residue deposits can be removed with soot blowers or sonic guns.
- Water Soluble: Unlike gypsum, AMS has a solubility of 160 g/l and can be easily removed with washing.
- Non-Corrosive: Where ammonium bisulfate has an acid pH, AMS solution (2% wt. solution) has a pH of 9, and is non-corrosive to equipment.

Please contact Martin Marietta for technical support on the use of UtiliMag[®] 40 Magnesium Oxide in SCR systems.

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