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WESPs FOR UTILITY BOILERS?

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We are hearing a lot of discussion about wet precipitators (WESP) for polishing of utility boiler flue gas discharges. Much of this interest comes from growing awareness among regulators that emissions from even the most sophisticated precipitator/FGD systems have significant quantities of sulfuric acid mist, heavy metals and/or toxic organics.

Cleaning these gas streams further with wet precipitators has considerable appeal because this technology has proven to be an effective technology for collecting light loadings of submicron particulate. This is particularly true when the gas stream has already been treated in a wet scrubbing system.

This situation is reminiscent of the early 1970's when the need for desulfurization of boiler flue gases was first recognized. At that time, the EPA established sulfur dioxide as a criteria pollutant and pushed the utility industry into trying a variety of desulfurization schemes. The results of many of these early efforts were, for utilities and equipment vendors alike, at best a costly learning experience.

Perhaps now is the time to reflect on the experience of the past in the context of growing interest in wet ESPs. While wet ESPs have been applied very successfully to a number of different sources, the application to coal fired utility boilers presents a number of special problems. A few are discussed below:

(1) Metallurgy - A wet ESP on the tail end of an FGD unit is subject to a highly corrosive situation. No one knows which alloy (or plastic) insures the 20+ years of service life that a utility demands.

(2) Configuration - "Upflow" designs can be placed directly on top of FGD absorber modules as a straightforward add-on. However, upflow designs tend to collect entrained mist droplets at the entrances of the collecting tube with finer, dry material being deposited further up the collecting surface. With such a tendency to form dry deposits, can an upflow design be kept clean and at optimum voltage? Perhaps the more costly but easier-to-clean downflow design will be more reliable.

(3) Fabrication - Common wall designs such as hex tubes or square egg crate designs have the advantage of utilizing both sides of the collecting surface. This also means that corrosion proceeds at twice the rate. Also these designs have myriad of crevices and welds. Are these tight areas an invitation to serious crevice corrosion? Once again, will the design last 20+ years?

The answer to these and many questions lies in the evaluation of wet ESP experience on other process applications and the adaption, through field testing, of proven wet ESP designs. Quite unlike the situation with FGD technology, in 1970, wet ESP technology is now highly developed and is successfully operating on a wide variety of sources. This experience base is available to the utility industry and is waiting to be explored and applied.

The combustion driven magnetohydrodynamics (MHD) electric power generator combined with a steam power plant has been under development for several years because of the increased efficiency offered over the conventional steam power plant. Yet to date, one of the stumbling blocks has been the removal of the fine particulate (less than lμm) found in the aerosol which is produced. Some of the APC devices tested are ESPs, baghouses, pulse jet fabric filters, wet ESPs and a novel ceramic filter developed by CeraMem Corporation, which will be discussed in the November issue of *CLEAR STACKS* .

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