APPLICATION OF THE ELECTROSCRUBBER* FILTER TO A MUNICIPAL SOLID WASTE INCINERATION PROJECT

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Discussion by

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The paper presents an interesting report on the application of an electrostatic granular filter on a modular controlled air incinerator. It will be interesting to see if any large mass burn incinerators choose this method of air pollution control and if the performance of the unit on the larger incinerators is comparable.

1. Have there been any problems with ash buildup on the high-voltage grid, or is the churning action by the media sufficient to keep it clean?

2. Referring to the emission test results in Table 1, do the particulate emission concentrations include the additional particulate emitted from the pulse-jet bag filters? If not, has this been measured?

3. How do the economics of the Electroscrubber Filter compare with the use of a conventional electrostatic precipitator or the potential use of fabric filters on incinerators? What are other advantages and disadvantages?

AUTHORS' REPLY

Regarding Mr. Hall's interest in seeing if the ELECTROSCRUBBER Filter will be applied to large mass burning incinerators, and whether the performance will be comparable, we should state that the Pittsfield installation was, for us, a relatively small project, notwithstanding it being our first on solid waste. For example, our typical installation on multifuel fired boilers is well over 200,000 ACFM, as compared to Pittsfield's 90,000 ACFM. As for performance, we have at hand many design criteria that can be selected responsive to tougher, or even easier, performance criteria than Pittsfield.

The following answers are in response to the specific questions asked by Mr. Hall.

1. Mr. Hall is correct in his supposition, that is, the grid does not experience a buildup of particulate because, since it is completely immersed in the moving media bed, it is continuously swept clean of any particle that may have adhered to the grid.

2. The emissions test results do not include emissions from the small bag filter, nor have we ever measured these emissions. Should a particular air quality management district ever consider the small bag filter stack a "second" emissions source, and want it to be tested, we would suggest to our customer, as we have done for other ELECTROSCRUBBER Filter installations, that he direct the bag filter outlet back into the ELECTROSCRUBBER Filter inlet duct.

3. As Mr. Hall must be aware, there are a multitude of factors to be considered in the "evaluated" cost of one piece of equipment vs another. Answering the specific question, however, the ELECTROSCRUBBER Filter should be comparable in capital cost to a single chamber, 3-field electrostatic precipitator (ESP). Installation cost for the ELECTRO-
SCRUBBER Filter will be less, especially if space is at a premium. Note also that the ash conveyor price would be included in ELECTROSCRUBBER Filter capital cost because the lift air blower provides the head to blow collected ash to the small bag filter. Operating power costs for the ELECTROSCRUBBER Filter should be about the same as for the ESP because higher ELECTROSCRUBBER Filter pressure drop costs will be offset by high TR set power cost for the ESP.

The prime “advantages” the ELECTROSCRUBBER Filter enjoys over the ESP are the capability for on-line maintenance (Pittsfield has had 100 percent availability), unless the ESP also included a second, redundant chamber at high incremental capital cost, and fuel flexibility, since particulate resistivity is of no concern as it is for the ESP. The prime “advantage” the ESP enjoys over the ELECTROSCRUBBER Filter is the capability of reducing size (e.g., offer 2 fields) and thereby cost if performance is “easy”.

Answering the same question comparing the ELECTROSCRUBBER Filter to a fabric filter is more difficult because the fabric filter data base is much smaller, both high air to cloth ratio (A/C) pulse jet fabric filters and low A/C reverse air fabric filters could be used, and quality of construction can be extremely varied. In general, though, the ELECTROSCRUBBER Filter will have about the same capital cost as a well specified, reasonable quality, reverse air fabric filter with glass bags. Installation cost for the ELECTROSCRUBBER Filter will be less, again, especially if space is a premium. The ash conveyor price would have to be added to the fabric filter price. Operating costs of both systems including pressure drop, will probably be the same.

The prime “advantages” the ELECTROSCRUBBER Filter would enjoy over the fabric filter are greatly reduced maintenance costs (the fabric filter bags, even if they survive the high acid gas environment, need to be replaced every 1 or 2 years), capability of handling incinerator upsets to 700-800°F, freedom from acid attack (no delicate filter bags in the process gas stream), capability of accepting high proportions of submicron particulate without causing high(er) operating pressure drops, and no need to preheat or to be concerned with moisture (acid) condensation during startup or during load swings. The prime “advantage” the fabric filter enjoys over the ELECTROSCRUBBER Filter is the capability of accepting very high inlet loadings and producing very low outlet loadings, assuming, of course, it survives the environment.