DRY SYSTEM EMISSION CONTROL FOR MUNICIPAL INCINERATORS

AARON J. TELLER
Teller Environmental Systems, Inc.
Worcester, Massachusetts

Discussion by

J. A. Fife
Camp Dresser & McKee
Boston, Massachusetts

Dr. Teller has written an informative article describing a new proprietary technology developed for simultaneous treatment of acid gases and sorbent-assisted collection of submicron particulates. The system utilizes carefully controlled “dry tower” flue gas cooling, in which water addition closely follows gas flow and temperature so that no unevaporated water leaves the tower. Neutralizing chemical is added to the tower, while a proprietary sorbent is added downstream, at a venturi which is said to agglomerate the submicron particulate. Following the venturi, an ESP or a fabric filter separates dry particulate from the gas stream. Where collection of gaseous pollutants is required, as in Europe and Japan today, and for incinerators, probably in the U.S. tomorrow, wet scrubber applications have disadvantages as indicated in the paper. Accordingly, dry “scrubber” development is of interest, and is being pursued overseas as well as in the U.S.

Dr. Teller rightly points out, albeit a bit strongly if taken verbatim, that “landfill creates leaching problems” (may create would be more correct) and “reduction of volume by combustion creates air pollution and solid waste disposal”. Is an emission within the regulations “air pollution”? Is the discharge of the residue from combustion of solid wastes “creation of solid waste”? (in both cases, hardly!) Nonetheless, dry scrubbing appears to offer significant reliability advantages over wet scrubbing, and as such, will probably be of significant interest here when regulations requiring removal of gaseous pollutants are adopted. In Germany, where gaseous pollutant emissions were regulated in 1974, the need for dry scrubber development and application to the cleanup of refuse flue gas is very well recognized. (See Feindler & Plürr, “From Coal Power to Refuse Power: The Successful Retrofit at Oberhausen,” Proceedings of 1980 National Waste Processing Conference.)

Applications of fabric filters to refuse fired combustion equipment are rare. In the U.S., they are currently limited to two plants, E. Bridgewater and Framingham, Massachusetts. Earlier installations, both trials, one in California at San Bernardino and one in Erie County, New York, failed due to inadequate flue gas temperature control, or to fires caused by glowing char. In the Teller system, the use of the water quench in the “dry” tower would probably eliminate the concern that glowing char would start a fire, but might introduce or amplify an equally serious concern, that of bag “blinding” caused by the collection of wet particulate, or particulate that becomes wet by condensation after collection. Startup and shutdown require extra care as flue gas temperature crosses dewpoint. Teller’s assertion that such systems are compatible with staff skills normally found at refuse burning plants is not easy to assimilate! Although a precipitator will have a higher first
cost, its pressure drop is less, and less operating power will be needed (See Tables 3 and 4). Further, it is made of steel, and is not nearly as susceptible to temperature excursion damage. Dr. Teller’s cost tables, showing a $0.899/ton maintenance cost for ESP’s and $0.278 for fabric filters, are surprising to this reader who would expect the replacement cost of filter bags to reverse this position. While considering the tables, it was noted that they do not include a cost for the quench water required, which would be perhaps somewhat higher for the fabric filter operating at about 500 F than for the ESP at about 600 F.

Details of the “dry” towers used for quenching are not given, but it should be remembered that three installations of this type of flue gas cooling at U.S. plants were troublesome in the 1970’s. New York’s S.W. Brooklyn and South Shore plants each had prototype systems, and the Town of Reading, Massachusetts, had two dry towers at its municipal incinerator. All of these gave trouble with wet gas at times, particularly on start-up and shutdown.

While preparing this discussion, the writer talked with incinerator plant staff at Framingham, Massachusetts, where, as reported in the paper, the first U.S. dry scrubber on a refuse combustion system is installed. The system has been in operation a little less than a year. It appears to be satisfactory to the person spoken with, who indicated that operation had been straightforward and reliable. Although emission testing has been done, results have not been reported at this writing.

Discussion by

Roger G. Burns
Wegman Engineers
New York, New York

The paper describes an air pollution control system that has promise in achieving a high level of efficiency in controlling gaseous and particulate emissions from municipal waste combustion processes.

The system appears manageable and would warrant consideration in the planning of new and/or upgrading existing facilities.

The successful operation of the system appears to be dependent on the seeding of the gas stream with a material TESISORB, said to be “solid and available locally.”

It would be helpful if the author would elaborate on this material; e.g., chemical and physical composition, size of particle, specific sources of supply, long term availability and representative cost per ton of material.

We would also request specific stack particulate emission test data and test methods used on existing TESI installations at Framingham and also in Japan. Data on waste heat recovery facilities would be especially useful.

A minimum thermal gradient seems to be required for the TESI Quench Reactor. What would be the minimum allowable gas temperature entering this reactor?