FURNACE/BOILER TEMPERATURE CORRELATION: MONTGOMERY COUNTY RESOURCE RECOVERY FACILITY 2 X 600 T/D PROCESS TRAINS

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Discussion by:

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The authors have presented an excellent paper describing regulatory acceptance of a large municipal waste-to-energy plant. The inclusion with the paper of extensive detailed graphs of operating and testing parameters will make the paper most useful to future engineering and research efforts as well. It was interesting to note the recognition and documentation of the different position-dependant temperatures experienced within components in the combustion train. Temperatures varied, depending on elevation and/or envelope proximity within the combustion component. Page 250, for example, notes a remarkable difference; a temperature of 1000°F near the ceiling could be correlated to a temperature of 1800°F in the furnace itself.

On p. 251 it would have been even more useful if the author had included actual formulas and calculations for adiabatic temperature determinations. Only a chart of values was included, and although extensive, it would have helped this reader if a least the formulas showing the relationships had been included.

Near the top of p. 248 the authors note that "MSW feed rates are not readily available for a short time test." This is not unusual. Short-term feed rates are very difficult to obtain. Load cells have not proved dependable in any municipal incineration facility known to me. Where they have been used, they have not lasted many days without needing serious recalibration.

For the purposes of the paper, feed rates were "backed out by use of higher heating value" data from the facility acceptance test. Might it not be possible to get more exact values for feed rates by backing out calculations based on stack carbon readings and stack flow rates? There are many solid waste studies that have determined average carbon content of various waste components, and even correlated carbon content and higher heating values. This facility probably measured stack flow rates and CO and CO_2 levels during these test periods, if not continuously. Since air pollution normally results from the combustion of primarily carbon-containing materials, it seems that a carbon-based back calculation might be the most precise measure of the feed rate possible in a "short term," "event instant" setting.

This was an excellent and detailed paper worthy of note. It appears the facility can probably function well. Perhaps the author would be so brave as to commit to a revisitation of this subject facility two years later at the 1996 ASME Solid Waste Processing Division Conference. This would allow a discussion of the facility operation experiences. We have many optimistic presentations like this of facilities about to begin production, but we have too little literature about plant operating experiences. Engineers and designers must learn from field experience so that new plants do not have to repeat the learning curve.

AUTHOR'S REPLY

Mr. Norton's comments on this paper are appreciated. It should be noted that the purpose of this study was develop operating conditions and procedures that would satisfy the state requirements regarding flue gas temperature and residence time and to demonstrate to the regulators that these requirements can be met. The testing program was designed to minimize the cost of the study and operational disruptions during testing, while providing accurate and reproducible results.

Regarding Mr. Norton's suggestion that the calculations of the adiabatic temperatures be shown, it should be noted that these temperatures are obtained from Fig. 6 in the paper. This graph was developed in 1958 through basic thermodynamic relations. Utilizing the heat content and moisture content of the flue gas, the adiabatic temperature is easily read from the graph.

Mr. Norton is correct in saying that load cells are not dependable for measuring the fuel feed rate. While it may be

possible to estimate the feed rate based on the emissions of the facility, this would require measurements of the stack gas flow rate. The facility is not equipped with flow monitors in the stack, so the measurement of the flow rate would require extra instrumentation and manpower, thus increasing cost and complexity of the test program.

While waste-to-energy facilities come in many different forms, many seem to have very similar operational challenges. It is important that facilities share information about these problems and work together to develop solutions. For a detailed description of the subject facility and a discussion of some of the problems faced during the first two years of operation, please see "Montgomery County Resource Recovery Facility" (Bayer, Lehr, Chae, and Schuetzenduebel) and "The Achievement of 'Good Combustion' by Improvement of Secondary Air Injection at the Montgomery County Waste to Energy Facility" (Bette, Schäfers, Kirschner, and Schuetzenduebel) in the *Proceedings of the 1994 National Waste Processing Conference.*