

Validation Study of FTIR-Based Emissions Measurements at a Municipal Waste Combustor

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ABSTRACT

EPA Test Methods 301 and 320 include statistical techniques for validating sampling methods in specific gas matrices. Several of these techniques were used to analyze extractive FTIR data collected at a municipal solid waste incinerator and to validate the method for hydrogen chloride (HCl) measurements. FTIR results for carbon monoxide (CO), sulfur dioxide (SO₂), and nitric oxide (NO) were also compared to measurements recorded by the facility's continuous emissions monitors (CEMs). Presented are discussions of the equipment, spectral analyses, and statistical comparisons of the various test methods.

INTRODUCTION

The work described here was performed in October, 2004, at two sampling locations of a municipal waste combustor. The major goal of the study was to validate extractive Fourier transform infrared (FTIR) spectrometry for measurements of gaseous hydrogen chloride (HCl) as described in Environmental Protection Agency (EPA) Test Methods 301¹ and 320². Three different validation procedures were successfully performed; they were direct comparisons with EPA's "manual" Test Method 26³, "single instrument" dynamic spiking, and "dual instrument" dynamic spiking. A secondary goal of the study was the comparison of CO, NO, and SO₂ results obtained using the standard CEMs

installed at the facility to those obtained using FTIR techniques. Four of the six Relative Accuracy Test Audits (RATAs) performed for these criteria pollutants were successful according to the statistical criteria required by EPA⁴; the average measured analyte concentrations for those (two) audits which failed were at the extremes of the CEM and FTIR instrument calibration ranges. A complete description of the method requirements and calculations is given in References 1 through 4; for brevity, only summaries are provided in this work. The referenced methods are available at the website.

<http://www.epa.gov/ttn/emc/promgate.html>