



Project Summary

Municipal Waste Combustion Assessment: Combustion Control at Existing Facilities

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The EPA's Office of Air Quality Planning and Standards (OAQPS) is developing emission standards and guidelines for new and existing municipal waste combustors (MWCs) under the authority of Sections 111(b) and 111(d) of the Clean Air Act (CAA). The EPA's Office of Research and Development (ORD) is providing support in developing the technical basis for good combustion practice (GCP), which is included as a regulatory alternative in the standards and guidelines. This report provides the supporting data and rationale used to establish baseline emission levels for model plants that represent portions of the existing population of MWCs. The baseline emissions were developed using the existing MWC data base or, where no data existed, engineering judgement. The baseline emissions represent performance levels against which the effectiveness and costs of emission control alternatives can be evaluated. An assessment of potential combustion retrofit options was developed and applied to each model plant, and emission reduction estimates were made for each retrofit application. This report provides the rationale used to estimate the emission reductions associated with each combustion retrofit.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to

announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

On July 7, 1987, the U.S. EPA announced its intent to develop air emission standards for new municipal waste combustors (MWCs) and emission guidelines for existing MWCs, under the authority of Section 111 of the Clean Air Act. The New Source Performance Standard (NSPS) will apply to all MWCs that commence construction after the proposal date, and the guidelines will apply to all MWCs not covered by the NSPS. Following the July 1987 announcement, an extensive background information development and data gathering effort was initiated to provide the technical support for the proposed regulations. The NSPS and guidelines development includes a performance assessment of emission control alternatives that are applied to hypothetical model plants. The models represent typical classes of MWCs within the existing and projected population. Baseline emission estimates are developed for each model plant, and various control alternatives are applied to each model to estimate the potential for reduction of emissions from baseline levels. Costs of control alternatives were estimated to permit calculation of the cost effectiveness of control options.

Model Plants

The EPA developed 12 model plants which represent groups of existing MWCs that will be regulated by the emission guidelines. Baseline emissions were established for each of the models and retrofit control alternatives were applied to each model plant. Emission reductions and costs were estimated, and the results were documented in an EPA report which served as one of the main background documents for the emission guidelines. This report summarizes the performance data and supporting rationale that were used to establish the baseline emission estimates for twelve MWC model plants and provides the rationale for estimating emission reductions that result from the application of combustion retrofits to each model plant. The retrofit options are intended to modify model plant performance to a level indicative of good combustion practice (GCP). GCP, defined and developed in EPA's Report to Congress on MWCs, requires that specific design, operation, control, and monitoring features be in place to optimize the combustion process, thus minimizing emission of organics and carbon monoxide (CO). This report summarizes the components of GCP and the design and operating features of the combustors in the data base and evaluates the extent to which recommended design and operating components of GCP are in place at each plant.

Twelve model plants were developed to represent the majority of combustor classes that would be regulated by the guidelines. The models included three mass burn waterwall MWCs, three mass burn refractory wall MWCs, one rotary waterwall MWC, one modular excess air MWC, two modular starved air MWCs, and two refuse-derived-fuel (RDF) fired spreader stoker MWCs. Information provided for each model plant included unit size, number of combustors per site, annual operating hours, energy recovery practices, and fuel type (either unprocessed municipal solid waste, or RDF).

Emission Estimates

Baseline uncontrolled emissions were estimated for five air pollutants: polychlorinated dibenzo-p-dioxins and dibenzofurans (CDD/CDF), CO, particulate matter (PM), hydrogen chloride (HCl) and sulfur dioxide (SO₂). Baseline HCl and SO₂ emissions were established based on assumed fuel chlorine and sulfur contents. Baseline

emissions for the remaining pollutants were established following review of emission data from existing MWCs or, where no data existed, on engineering judgement. After assigning baseline emissions, the design and operating features of each model plant were evaluated relative to the GCP recommendations for each class of combustors. Retrofit options were recommended for the model plants that lacked specific GCP design and operating features, and emission reductions and costs were estimated for each retrofit application.

The variation in baseline CDD/CDF emissions reflects the wide range of data available from plants in the existing MWC population. Several mass burn waterwall and modular MWC model plants were judged to satisfy the GCP criteria. Baseline CDD/CDF emissions for these model plants were 200-300 ng/dscm, and retrofit recommendations were limited to installation of CO emission monitors to provide continuous verification of performance levels. Several model plants were assigned baseline CDD/CDF emissions ranging from 2000 to 4000 ng/dscm, and fairly extensive design and operating modifications were judged to be necessary to achieve GCP. The results of two combustion retrofit programs at the Quebec City (Quebec) and Hampton (Virginia) mass burn waterwall MWCs are summarized in the report. These retrofit programs provide technical support for retrofit options that were recommended for the model plants, and for estimating emission reductions that result from the combustor retrofits.

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The complete report, entitled "Municipal Waste Combustion Assessment: Combustion Control at Existing Facilities," (Order No. PB 90-154931/AS; Cost: \$23.00 subject to change) will be available only from:

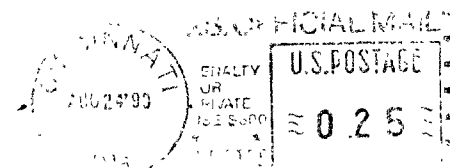
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