



Project Summary

Assessment of the Controllability of Condensable Emissions

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The report gives results of a study to gain insights into the condensable emissions area from an air toxics perspective, with emphasis on controllability and chemical composition of these emissions. The study: compiled existing data on condensable emissions; determined the chemical composition of condensable emissions, where possible; identified source categories that are major emitters of condensables; evaluated the effectiveness of various control devices in reducing condensable emissions; and evaluated how the performance of currently available control technologies can be improved to better control condensable emissions.

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

As part of current U.S. Environmental Protection Agency (EPA) efforts to better understand and quantify condensable emissions, this study was initiated to develop an understanding of condensable emissions from an air toxics perspective. The major objectives of the study were to: (a) develop a data base on condensable emissions, (b) determine chemical makeup of condensable emissions, and (c) evaluate effectiveness

of various control devices in reducing condensable emissions and identify modifications to improve performance.

Two data bases were developed from a review of emissions source test reports from EPA's Emission Measurement Branch (Office of Air Quality Planning and Standards/Technical Support Division) files and from the State of California. The Condensibles Data Base contains information on condensable emissions covering 43 emission source categories. The Speciated Condensibles Data Base focuses on the chemical composition of condensable emissions. For this study, the back-half catch of the EPA Reference Method 5 or its equivalent was considered to represent the condensible fraction.

Based on the data contained in the Condensibles Data Base, source categories with a relatively high percentage of condensibles in the total particulate catch (i.e., > 50%) included plywood manufacturing, asphaltic concrete, electric utilities, fertilizer manufacturing, and secondary lead smelting. From the limited data on chemical composition of condensed particulate matter, the toxic fraction (composed of arsenic, beryllium, cadmium, chromium, lead, mercury, and vanadium) of condensed particulate matter was < 1% in most cases.

For many sources in the Condensibles Data Base, wet scrubbers including venturi scrubbers, fabric filters, electrostatic precipitators (ESPs), and wet ESPs were the commonly employed particulate matter control devices. The wide variation in performance of these devices in controlling condensible



emissions was attributed to differences in emission source characteristics such as temperature, composition, and concentration. Although limited performance data were available for specific control devices, venturi scrubbers and other wet scrubbers appeared to be more effective in reducing condensible emissions

than other control devices. No general conclusions were drawn regarding controllability of specific condensible components because of limited data.

Modifications in control device operation/design that would affect potential reductions in condensible emissions include: (a) operating at lower temperatures and higher humidity levels

to enhance condensed particulate formation prior to the control device, (b) adding an ionizing section before wet/venturi scrubbers to improve collection efficiency of the fine particulate, and (c) using gas conditioning agents to induce condensed particle agglomeration.

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Carlos M. Nunez is the EPA Project Officer (see below).

The complete report, entitled "Assessment of the Controllability of Condensable Emissions," (Order No. PB 91-125 807/AS; Cost: \$17.00, subject to change) will be available only from:

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