



Project Summary

Environmental Assessment Measurement Methods for Organic Species

Philip L. Levins

The full report summarizes work by the contractor on sampling and analysis methods for organic species relating to environmental assessment and control technology. The term-level-of-effort work involved assignments carried out under separate technical directives (or tasks). Most of the work has been published in detailed technical reports for each directive. This report summarizes the studies and alerts readers to the availability of the technical reports.

This Project Summary was developed by EPA's Industrial Environmental 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

The U.S. EPA has on-going studies related to environmental assessment and control technology development projects for the stationary source energy and industrial process programs. The Technical Support Staff of U.S. EPA's Industrial Environmental Research Laboratory at Research Triangle Park has provided support to those studies through a series of contracts whose focus was organic and inorganic measurement techniques, particulate sampling and characterization, fugitive emissions measurement methodology, and quality assurance programs. The work described in this report dealt with evaluating and developing new techniques for the sampling and analysis of organic species.

The studies carried out in the course of the program were grouped into several major categories which included:

- Evaluation and development of measurement methods.
- Preparation of guideline and procedures manuals.
- Sampling and analysis support to on-going programs.
- Adaptation of existing methods for particular programs and evaluation of the applicability of certain methods.
- Review of measurement and test programs.

As part of this program a continuing review of new technology was carried out, to be able to apply new concepts and techniques to the measurement programs on a timely basis. As new methods surfaced, they were reviewed with the Project Officer to determine whether specific studies should be carried out to assess the applicability of the technique to the EPA program needs.

The studies carried out under the program can be categorized into three program areas:

- Research and development.
- Sampling and analysis program support.
- Technical assistance.

The research and development tasks generally involved the development or evaluation of new methodology for environmental assessment and control technology measurements. Support was provided to various EPA programs in tasks ranging from analysis of

supplied samples to assistance in source sampling and the preparation of manuals. Quick response technical assistance was available through the program to a wide range of people in EPA, contractor laboratories, and industry.

Detailed technical reports were provided for each major task completed under this contract; these are available from NTIS. Reports produced under this contract are listed below. Completed directives issued under the contract include:

Research and Development

Technical Directive	Description
10102	A multi-task directive to evaluate various aspects of the Level 1 organic sampling and analysis procedures.
10202	Development of specific Level 2 procedures for a variety of organic groups, especially polychlorinated biphenyls (PCB) and polynuclear aromatic hydrocarbons (PAH).
10302	Evaluation and development of simplified (e.g., spot test) class analysis procedures.
10402	Investigation of the applicability of high resolution mass spectrometry (HRMS) methods to the analysis of complex samples.
10501	Examination of storage and shipping effects on sample stability and contamination.
10601	Selection and characterization of adsorbents to be used in the sorbent trap module of the SASS and similar sampling systems.
10702	Evaluation of Level 2 procedures for the directed analysis of specific compound classes and investigation of reliable gas collection methods for qualitative analysis. Also, evaluation of Level 2 procedures for difficult-to-analyze samples.
10801	Development of a sorbent module procedure for the concentration of organic species from water for subsequent analysis.
10901	Development of the sorbent module portion of the FAST train; activities coordinated with TRC.
<i>Program Support</i>	
20104	State-of-the-art literature review, carried on for the duration of the contract.
20202	Assist the Combustion Research Branch of IERL-RTP in the development of a Level 1 laboratory.
20402	Analyze PCB in fish in support of evaluation of a proposed PCB removal technology.
20502	Characterize the capabilities of the Level 1 organic analysis procedures in the context of the compounds associated with the multimedia environmental goals (MEG) activities.
20602	Prepare a technical manual for the analysis of fuels.
20802	Participate in the textile industry pilot study evaluation of the Level 1 procedures.
20901	Determine the feasibility of sampling flares.
21202	Analyze samples collected by SASS trains using the Level 1 organic analysis procedures in conjunction with an evaluation of Level 1 procedures conducted by the Research Triangle Institute.
21301/ 21401	Development of approaches for sampling of atmospheric emissions from coal gasification.
21502	Analyze samples and prepare a final coordinated report for samples collected by Monsanto Research Corporation from a ferroalloy process in conjunction with a control technology evaluation.
21602	Analyze particulate samples from stoker furnace emissions for PAH.
21802	Evaluate organic analysis procedures used by EPA Effluent Guidelines Division contractors for analysis of aqueous effluent samples from the organics and plastics industry.

Reports and Published Papers

The following reports were produced under this contract:

- Technical Manual for the Analysis of Fuels L.N. Davidson, W.J. Lyman, D. Shooter, and J.R. Valentine Report EPA-600/7-77-143, December 1977; NTIS PB-279 196.
- Effect of Handling Procedures on Sample Quality J.W. Adams, T.E. Doerfler, and C.H. Summers Report EPA-600/7-78-017, February 1978; NTIS PB-279 910.
- Characterization of Sorbent Resins for Use in Environmental Sampling R.F. Gallant, J.W. King, P.L. Levins, and J.F. Piecewicz Report EPA-600/7-78-054, March 1978; NTIS PB-284 347.
- EPA/IERL-RTP Interim Procedures for Level 2 Sampling and Analysis of Organic Materials (superseded by EPA-600/7-79-033) J.C. Harris and P.L. Levins Report EPA-600/7-78-016, February 1978; NTIS PB-279 212.
- Sensitized Fluorescence for the Detection of Polycyclic Aromatic Hydrocarbons E.M. Smith and P.L. Levins Report EPA-600/7-78-182, September 1978; NTIS PB-287 181.
- Ferroalloy Process Emissions Measurements J. L. Rudolph, J.C. Harris, Z.A. Grosser, and P.L. Levins Report EPA-600/2-79-045, February 1979z NTIS PB-293 171.
- Measurement of PCB Emissions from Combustion Sources P.L. Levins, C.E. Rechsteiner, and J.L. Stauffer Report EPA-600/7-79-047, February 1979; NTIS PB-293 360.
- EPA/IERL-RTP Procedures for Level 2 Sampling and Analysis of Organic Materials J.C. Harris, M.J. Hayes, P.L. Levins, and D.B. Lindsay Report EPA-600/7-79-033, February 1979; NTIS PB-293 800.
- Gas Sample Storage K.E. Thrun, J.C. Harris, and K. Beltis Report EPA-600/7-79-095, April 1979; NTIS PB 298 350.
- Measurement of Polycyclic Organic Matter for Environmental Assessment P.L. Levins, C.E. Rechsteiner, and J.L. Stauffer Report EPA-600/7-79-191, August 1979; NTIS PB80-111966.
- Further Characterization of Sorbents for Environmental Sampling J.F. Piecewicz, J.C. Harris, and P.L. Levins Report EPA-600/7-79-216, September 1979; NTIS PB80-118763.

The following papers, from portions of work carried out during the program, have been published in technical journals and proceedings:

- High Resolution Mass Spectrometry Matrix Analysis of Environmental Samples J.L. Stauffer, P.L. Levins, and J.E. Oberholtzer *Carcinogenesis, Vol. 3: Polynuclear Aromatic Hydrocarbons*, Edited by P.W. Jones and R.I. Freudenthal, Raven Press, N.Y., 1978, pp. 89-95.
- Quantitative Extraction of Polycyclic Aromatic Hydrocarbons and Other Hazardous Organic Species from Process Streams Using Macroreticular Resins Z.A. Grosser, J.C. Harris, and P.L. Levins in *Polynuclear Aromatic Hydrocarbons-Third International Symposium, Edited by P.W. Jones and P. Leber, Ann Arbor Science, 1979, pp. 67-79.*
- Sensitized Fluorescence Detection of PAH E. M. Smith and P. L. Levins *Polynuclear Aromatic Hydrocarbons, Fourth Battelle Symposium, Battelle Press, Ohio, 1980, pp. 973-982.*
- A New Procedure for the Measurement of Polychlorinated Biphenyls (PCBs) in Combustion Sources P.L. Levins, C.E. Rechsteiner, and J.L. Stauffer *Journal American Institute of Chemical Engineers, 196, 330-337 (1980).*

P. L. Levins is with Arthur D. Little, Inc., Cambridge, MA 02140.

Larry D. Johnson is the EPA Project Officer (see below).

The complete report, entitled "Environmental Assessment Measurement Methods for Organic Species," (Order No. PB 82-231 937; Cost: \$7.50, subject to change) will be available only from:

National Technical Information Service

5285 Port Royal Road

Springfield, VA 22161

Telephone: 703-487-4650

The EPA Project Officer can be contacted at:

Industrial Environmental Research Laboratory

U.S. Environmental Protection Agency

Research Triangle Park, NC 27711

United States
Environmental Protection
Agency

Center for Environmental Research
Information
Cincinnati OH 45268

Postage and
Fees Paid
Environmental
Protection
Agency
EPA 335



Official Business
Penalty for Private Use \$300

PS 0000329
U S ENVIR PROTECTION AGENCY
REGION 5 LIBRARY
230 S DEARBORN STREET
CHICAGO IL 60604