## **Acknowledgements**

he development of this document, Building Air Quality: A Guide for Building Owners and Facility Managers, has been a joint undertaking of the Indoor Air Division in the Office of Atmospheric and Indoor Air Programs of the United States Environmental Protection Agency and the National Institute for Occupational Safety and Health. The document was prepared under the direction of Robert Axelrad, Director, EPA Indoor Air Division and Philip J. Bierbaum, Director, NIOSH Division of Physical Sciences and Engineering.

EPA and NIOSH appreciate the time that many organizations and individuals took to share ideas, discuss their own practical experiences, and review many drafts of this document. Many of the ideas raised by these reviewers have been incorporated into this document.

Two people had primary responsibility for developing the content and format of the document. Elizabeth Agle, the EPA project manager, developed the structure of the document, assembled the teams of contributors and reviewers, and provided direction and untiring support as the project came to fruition. Susan Galbraith, Cogito Technical Services, served as the principal writer. She brought to the task both considerable writing skills and a basic understanding of how buildings operate that proved invaluable throughout the process of conceptualizing and creating this document.

EPA and NIOSH gratefully acknowledge the important contribution of Terry Brennan, Camroden Associates; Ed Light, Pathway Diagnostics; and William A. Turner, The W.L. Turner Group, who

served as the team of core technical advisors for this document. These individuals contributed a substantial amount of written material and thoughtful comments on the many drafts and, most importantly, their considerable practical experience in identifying and resolving indoor air quality problems. Joseph Lstiburek, Building Science Corporation, contributed much of the material on the problem of moisture. EPA and NIOSH particularly wish to thank the staff of The Charles E. Smith Companies who reviewed numerous drafts of the document and made invaluable comments from a building management perspective.

The photographs were donated by: Terry Brennan, Camroden Associates; Michael Crandall, NIOSH; Ed Light, Pathway Diagnostics; Joseph Lstiburek, Building Science Corporation; Phil Morey, Clayton Environmental Services; Tedd Nathanson, Public Works Canada; Robert Olcerst, Brujos Scientific Inc.; Stan Salisbury, NIOSH; William A. Turner, The H.L. Turner Group; and Kenneth Wallingford, NIOSH. Additional slides came from the NIOSH Health Hazard Evaluation Program and from the Occupational Safety and Health Administration.

A large number of people within both EPA and NIOSH commented on the drafts of the document. EPA and NIOSH recognize the following staff for their particular contributions: John Girman, Elissa Feldman, Pauline Johnston, Sue Perlin, David Mudarri, Jack Primack, Bob Thompson, Kevin Teichman, Charles Truchillo, and Jim Wilson, EPA; and Michael Crandall, Jerome Flesh, Richard Gorman, Joseph Hurrell, Pantelis Rentos, and Mitchell Singal, NIOSH.

The draft document was widely circulated for review outside these agencies. EPA and NIOSH thank the following individuals who reviewed all or part of the document and submitted comments:

Allen C. Abend

Maryland Department of Education

Charles A. Achilles

Institute of Real Estate Management

Henry A. Anderson

Wisconsin Department of Health and

Social Services David W. Bearg Life Energy Associates

W. David Bevirt

Sheet Metal and Air Conditioning

Contractors Association

Barbara Billauer

International Council of Shopping Centers

**Bob Bockholt** 

National Apartment Association

H.E. Burroughs

H. E. Burroughs & Associates, Inc.

Harriet Burge

University of Michigan Medical Center

Paul A. Cammer

Business Council on Indoor Air

James L. Coggins Energy Applications, Inc.

Geraldine V. Cox

Chemical Manufacturers Association

Earon S. Davis

**Environmental Heath Consultant** 

John E. DiFazio, Jr.

Chemical Specialties Manufacturers

Association
James C. Dinegar

Building Owners and Managers Association, International Stephen D. Driesler

Stephen D. Driesiei

National Association of Realtors

Sandra Eberle

U.S. Consumer Product Safety

Commission
Paul C. Fiduccia

International Council of Shopping Centers

Richard B. Gammage

Oak Ridge National Laboratory

Matthew Gillen

Occupational Health Foundation

William H. Groah

Hardwood Plywood Manufacturers

Association Shirley J. Hansen Hansen Associates

Steven B. Hayward

Indoor Air Quality Program, California

Department of Health Services

John Henshaw

American Industrial Hygiene Association

Bion Howard

Alliance to Save Energy

W. T. Irwin

CertainTeed Corporation

Paul Jacobetz

Brüel & Kjaer Instruments, Inc.

William D. Kelley

American Conference of Governmental

Industrial Hygienists, Inc.

Jay Kirihara

The Trane Company

Daniel A. La Hart

Maryland Department of the Environment

Mary Lamielle

National Center for Environmental

Health Strategies

Ellen Larson

Air Conditioning Contractors of America

David Lee

Association of Local Air Pollution

Control Officials Eugene L. Lehr

U.S. Department of Transportation

Hal Levin

Indoor Air Bulletin

William H. McCredie

National Particleboard Association

Jean F. Mateson

Mateson Environmental Management, Inc.

Keith Mestrich

Food and Allied Service Trades

Eugene M. Moreau Indoor Air Program,

Maine Department of Human Services

Niren L. Nagda

GEOMET Technologies, Inc.

Fred Nelson

National Foundation for the Chemically Hypersensitive

Laura Oatman

Indoor Air Quality Program, Minnesota Department of Health

Andrew Persily

National Institute for Standards and

Technology

George R. Phelps

Thermal Insulation Manufacturers

Association, Inc.

Wiliam A. Pugsley

Lincoln-Lancaster County Health

Department (Nebraska)

G.S. Rajhans

Ontario Ministry of Labour

Susan Rose

U.S. Department of Energy

Steven A. Scala

U.S. Public Health Service

James Sharpe

The Charles E. Smith Companies

Richard J. Shaughnessy, III

Indoor Air Program, University of Tulsa

Thomas J. Shepich

Occupational Safety and Health

Administration

Henry J. Singer

General Services Administration

Philip A. Squair

Air-Conditioning and Refrigeration

Institute

John H. Stratton

Sheet Metal and Air Conditioning

Contractors Association

Kenneth M. Sufka

Associated Air Balance Council

John M. Talbott

U.S. Department of Energy

Simon Turner

Healthy Buildings International, Inc.

Richard A. Versen

Manville Technical Center

Davidge Warfield

National Air Duct Cleaners Association

Lewis Weinstock

Forsyth County Environmental Affairs

Department (Georgia)

John F. Welch

Safe Buildings Alliance

Arthur E. Wheeler

Wheeler Engineering Company

Jim H. White

Canada Mortgage and Housing

Corporation

W. Curtis White

Aegis Environmental Management, Inc.

Alexander J. Willman

National Energy Management Institute

Myra Winfield

Veterans Administration (Texas)

James E. Woods

College of Architecture and Urban Studies,

Virginia Polytechnic Institute

Rita Cohen, of ICF, Inc., assisted in the project management for the development of this document. Marie O'Neill, of The Bruce Company, provided editorial and coordination assistance. EPA and NIOSH extend special thanks to Linda Berns, Terry Savage, and others at the firm of Berns & Kay, Ltd. for their effort and enthusiasm in designing and producing the document under tight deadlines.