

APPENDIX B

DATA ON SCIENTIFIC COLLABORATORS

GEORGE E. McVEHIL, Ph.D.
Certified Consulting Meteorologist
McVehil-Monnett Associates, Inc.

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Dr. McVehil has more than 37 years of professional experience in boundary layer and air pollution meteorology, and the application of atmospheric science to industrial and environmental impact problems. His consulting practice specializes in air pollution modeling, air permitting and regulatory analysis, assessment of industrial atmospheric impacts, and litigation support services.

Dr. McVehil has authored several hundred papers, technical reports, impact assessments, and permit application documents. He is a nationally recognized authority on atmospheric effects of evaporative cooling towers and industrial cooling systems. Recent analyses and reports prepared by Dr. McVehil have involved analyses of acid deposition, air quality impacts of metals refineries and smelters, power generation facilities, and mining operations, and deposition of heavy metals and hazardous chemicals from contaminated soil and industrial sources.

In addition to the above technical areas, Dr. McVehil's responsibilities at MMA include supervision of complex air modeling analyses, preparation of Title V and PSD/NSR air permit applications, and review and audit of meteorological and air quality data. A significant portion of his time is devoted to litigation support activities, including analyses, consultation to law firms, and expert testimony. Litigation subjects include air dispersion modeling, transport, dispersion, and deposition of hazardous pollutants, and meteorological factors in accident cases.

Dr. McVehil is a Fellow of the American Meteorological Society, and a Certified Consulting Meteorologist. He has been a Certified Consulting Meteorologist since 1972, and was elected a Fellow of the Society in 1984. Dr. McVehil has served as member and Chairman of the Society's Board for Certified Consulting Meteorologists, and has served on other committees of the Society. He is a past President and Director of the National Council of Industrial Meteorologists.

SPECIAL AWARDS

1998 Award for Outstanding Contribution to the Advance of Applied Meteorology,
American Meteorological Society, Boston, MA, January 1998

EDUCATION

- B.A. Physics, 1958, WASHINGTON AND JEFFERSON COLLEGE
- B.S. Meteorology, 1957, MASSACHUSETTS INSTITUTE OF TECHNOLOGY
- M.S. Meteorology, 1958, MASSACHUSETTS INSTITUTE OF TECHNOLOGY
- Ph.D. Meteorology, 1962, PENNSYLVANIA STATE UNIVERSITY

EXPERIENCE

1987-Present vice President/Secretary/Treasurer, McVEHIL-MONNETT ASSOCIATES, INC.

1984 - 1987 Partner, McVEHIL-MONNETT ASSOCIATES

1974 - 1984 Independent Meteorological Consultant

Consultation, analysis, reports and testimony for industrial clients and governmental agencies. Primary areas of service included environmental impact assessments, air quality permit applications, analysis of meteorological and pollution data, dispersion modeling, plant siting, and weather effects on industry.

1970- 1974 BALL AEROSPACE CORPORATION, Environmental Systems Group (Formerly Sierra Research Corporation, Environmental Systems Division)

Manager, Technical Services

Responsible for technical management of BALL's meteorological and air quality monitoring, and consulting services activities. Provided technical oversight for consulting service contracts and air quality impact analyses, specialized consultation to power industry and industrial clients, testimony, and final consulting reports.

1969 - 1970 EG&G, Inc. Environmental Services Operation

Manager Technical Services

Responsible for management and technical direction of field services and research contracts in air pollution, weather modification, and applied meteorology. Provided direct research, report and proposal preparation, and technical supervision of all service contracts.

1962 - 1969 CORNELL AERONAUTICAL LABORATORY, INC.

Research Meteorologist and Head, Dynamic Meteorology Section

Conducted basic and applied research in atmospheric diffusion and turbulence, air-sea interactions, weather phenomena related to the Great Lakes, weather modification, wind tunnel modeling of meteorological flows, radar meteorology, and meteorological influences on military weapons and operations. Principal Investigator on more than ten research contracts.

1958 - 1962 PENNSYLVANIA STATE UNIVERSITY

Graduate Assistant, 1958 - 1960, Instructor, 1960 - 1961, **Research Assistant**, 1961 - 1962

As Graduate and Research Assistant, performed research on wind structure and turbulence in the planetary boundary layer. As full-time instructor in Meteorology, taught undergraduate courses in dynamic meteorology, thermodynamics of the atmosphere, applications of statistics to meteorology, and synoptic meteorology.

ORGANIZATIONS/HONORS

AMERICAN METEOROLOGICAL SOCIETY - Fellow, Certified Consulting Meteorologist

ROYAL METEOROLOGICAL SOCIETY, Fellow

AIR & WASTE MANAGEMENT ASSOCIATION (formerly APCA)

NATIONAL COUNCIL OF INDUSTRIAL METEOROLOGISTS - President, 1976-1977

AMERICAN METEOROLOGICAL SOCIETY - 1998 Award for Outstanding Contribution to the Advance of Applied Meteorology

PUBLICATIONS

Panofsky, H.A., Blackadar, A.K., and McVehil, G.E., 1960: "The Diabatic Wind Profile." Quarterly Journal of the Royal Meteorological Society, 86, 390-398.

McVehil, G.E., 1964: "Wind and Temperature Profiles Near the Ground in Stable Stratification." Quarterly Journal of the Royal Meteorological Society, 90, 136-146.

McVehil, G.E., Pilie, R.J., and Zigrossi, G.A., 1965: Some Measurements of Balloon Motions with Doppler Radar." Journal of Applied Meteorology, 4, 146.

Fichtl, G.H., and McVehil, G.E., 1970: "Longitudinal and Lateral Spectra of Turbulence in the Atmospheric Boundary Layer at the Kennedy Space Center." *Journal of Applied Meteorology*, 9, 51.

American Society of Mechanical Engineers, 1975: "Cooling Tower Plume Modeling and Drift Measurement. A Review of the State-of-the-Art." (Authored by G.E. McVehil and K.E. Heikes) ASME, New York, New York, 170 pages.

McVehil, G.E. and Umenhofer, T.A., 1981: "Assessment of Coal Dust Emissions from Power Plants for PSD Permit Applications." *Proceedings of the American Power Conference*, Vol. 43. Illinois Institute of Technology, Chicago, Illinois.

McVehil, G.E., 1990: "Model Estimates of Provincial Scale Atmospheric Sulphur Dioxide and Oxides of Nitrogen in Alberta." In "Acidic Deposition: Sulphur and Nitrogen Oxides", A.H. Legge and S.V. Krupa, Editors, Lewis Publishers, Chelsea, Michigan, 481-18.

EDWARD L. ADDISON

Environmental Scientist/Engineer
McVehil-Monnett Associates, Inc.

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Mr. Addison is a graduate environmental engineer with a strong academic background in both engineering (M.S.) and atmospheric sciences (B.S.). He has nearly twelve years of professional experience in the areas of analysis and quality assurance of air quality and meteorological data, dispersion modeling, report writing and scientific programming. At MMA, Mr. Addison is responsible for dispersion modeling, scientific programming and quality assurance/quality control activities.

EDUCATION

Civil Engineering, 1990, SOUTH DAKOTA SCHOOL OF MINES
AND TECHNOLOGY

Meteorology, 1987, METROPOLITAN STATE COLLEGE OF
DENVER

EXPERIENCE

1992-Present Air Quality Engineer/Meteorologist
McVEHIL-MONNETT ASSOCIATES, INC

1990-1992 Air Quality Meteorologist
AEROVIRONMENT, INC., Lakewood, Colorado

Experienced in the collection and evaluation of air pollution data from throughout the National Park system. Responsible for final level check of both air quality and meteorological data collected from National Park Service baseline and trend sites. Other responsibilities include all in-house scientific programming and monthly data report generation.

1987-1989

Civil Engineering Department, Graduate Research Assistant
SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY

Manipulated a large database of water resources and meteorological data in order to develop water yield models for selected basins within the Black Hills of South Dakota.

ORGANIZATIONS

AMERICAN METEOROLOGICAL SOCIETY
AIR & WASTE MANAGEMENT ASSOCIATION (formerly APCA)

KEITH A. BAUGUES, P.E.
Senior Environmental Engineer
McVehil-Monnett Associates, Inc.

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Mr. Baugues is a registered professional engineer with over 28 years experience in air quality engineering, emission inventory development, facilities permitting and review, dispersion modeling and data analysis. Mr. Baugues had a distinguished career as a national-level expert with the U.S. Environmental Protection Agency (U.S. EPA). His work history spans eight years with the Office of Air Quality Planning and Standards in Research Triangle Park, North Carolina, one year with the Region VI office in Dallas as regional air quality modeler, six years with the Indiana Air Pollution Control Division as engineer and Chief of the Modeling and Data Analysis Section, and over eleven years as a consultant. Mr. Baugues has been responsible for numerous Title V operating permit applications for clients in the aerospace, ceramics, gas transmission, utility, can recycling and mining industries and general permitting of gold and coal mines. In addition, he has prepared numerous databases/programs to demonstrate compliance with Title V requirements and to estimate toxic emission inventory values for TRI or state requirements.

Mr. Baugues' technical areas of expertise include the preparation of emission inventories, dispersion modeling and permitting of industrial facilities. His experience in emission inventory development includes preparation of numerous mobile source emission inventories, estimation of biogenic (vegetation) emissions, photochemical reactivity analyses, preparation of guidance for state agencies and development of a national emission inventory. Mr. Baugues also oversaw the preparation of emission inventories for use in regional photochemical modeling analyses. As a private consultant, Mr. Baugues was responsible for the preparation of air quality permit applications for PSD and minor sources, performed all phases of dispersion modeling, carried out power plant siting studies and developed State Implementation Plans for Colorado, Montana, Minnesota and Indiana.

At MMA, Mr. Baugues leads the firm's activities in emission inventory development and federal operating permit preparation for industrial facilities.

EDUCATION

B.S. Biological Engineering, 1973, ROSE HULMAN INSTITUTE OF TECHNOLOGY

Has successfully completed over 20 EPA and APCD courses covering environmental statistics, data quality assurance, dispersion modeling, air pollution meteorology, combustion evaluation, and air pollution control technology.

EXPERIENCE

- 1992 - Present McVEHIL-MONNETT ASSOCIATES, INC., Englewood, Colorado
Senior Environmental Engineer
Prepared Title V applications for a wide range of clients. Developed databases/software to track Title V compliance or estimate toxic emissions. Permitted coal and gold mines in the U.S. and worldwide.
- 1984 - 1992 U.S. ENVIRONMENTAL PROTECTION AGENCY, Durham, North Carolina
Office of Air Quality Planning and Standards
Environmental Engineer
Developed guidance for the application of photochemical models and for the development of emission inventory data. Oversaw preparation of guidance documents on estimating biogenic emissions, procedures for projecting emissions to future years, and techniques for converting a base year inventory into a modeling inventory. Provided guidance to States and participated in national workshops.
- 1984 U.S. ENVIRONMENTAL PROTECTION AGENCY, Dallas, Texas
Region VI, SIP Section
Regional Air Quality Modeler
Served as Regional Modeler, providing guidance to state agencies, industry and consultants relating to photochemical and dispersion model applications. Reviewed State Implementation Plans. Conducted analyses to estimate the number of areas that would exceed the PM-10 standard.

- 1981 - 1983 TERA CORPORATION, Dallas, Texas
Senior Air Quality Engineer
Performed statistical analyses of air quality and meteorological data. Conducted technical analyses and prepared permit applications (PSD and state) for major industrial, mining, biomass, chemical and utility projects. Applied and analyzed results of air quality simulation models. Carried out numerous power plant siting studies.
- 1979 - 1980 ETA ENGINEERING, INC., Westmont, Illinois
Associate Environmental Engineer
Reviewed air quality data, developed emission inventories, conducted dispersion model analyses, analyzed the results and prepared control strategies. Developed State Implementation Plans for lead for Colorado, Montana, Minnesota and Indiana. Conducted an analysis for the National Commission on Air Quality reviewing modeling techniques, emission inventory data and assumptions utilized in preparing State Implementation Plans for the Minneapolis, Minnesota area.
- 1976 - 1979 INDIANA AIR POLLUTION CONTROL DIVISION, Indianapolis, Indiana
Section Chief, Modeling and Data Analysis Section
Supervised six to eight employees including: engineers, meteorologists, statisticians, physical scientists and sanitarians. Responsible for conducting or reviewing dispersion modeling analyses for: SIP development, monitor placement, PSD/NSR and special studies. Oversaw Emission Inventory Subsystem (EIS/P&R), Air Quality Data Handling System (AQDHS-II) and meteorological data bases.
- 1973 - 1976 INDIANA AIR POLLUTION CONTROL DIVISION, Indianapolis, Indiana
Sanitary Engineer
Prepared and maintained emission inventory data bases. Reviewed thousands of air pollution permit applications, issuing operating and construction permits as appropriate. Prepared input and applied dispersion models. Provided engineering assistance to local air pollution control agencies.

ORGANIZATIONS

Professional Engineer - Illinois
Air and Waste Management Association

PUBLICATIONS

K.A. Baugues, "A Look at the Differences Between Base SIP Emission Inventories and Photochemical Modeling inventories", presented at the 86th Annual Meeting of the Air & Waste Management Association, Denver, CO, June 1993.

K.A. Baugues, "Application of Receptor Modeling for VOC Emissions", presented at the Emission Inventory Issues Conference, Durham, NC, October 1992.

K. A. Baugues, J. S. Culbertson, E. J. Laich, E. H. Pechan, S. R. Rothschild, D. A. Solomon, J. H. Wilson, M. C. Wimberly and W. Battye, "Interim 1990 Emission Inventory for the Nation", presented at the Emission Inventory Issues Conference, Durham, NC, October 1992.

A. VanMeter, K. A. Baugues and M. Bouley, "Estimation of Biogenic Emissions for the Atlanta Area: Comparison of Methodologies", presented at the Emission Inventory Issues Conference, Durham, NC, October 1992.

K.A. Baugues, "Further Comparisons of Ambient and Emission Inventory NMOC/NO_x Ratios", presented at the 85th Annual Meeting of the Air & Waste Management Association, Kansas City, MO, June 1992.

K.A. Baugues, "A Review of Speciated NMOC Data", presented at the Measurement of Toxic and Related Air Pollutants, Durham, NC, May 1992.

K.A. Baugues, "A Summary of NMOC, NO_x and NMOC/NO_x Data Collected Between 1984 and 1988", presented at the Measurement of Toxic and Related Air Pollutants, Durham, NC, May 1992.

M.D. Bouley and K.A. Baugues, "PC-BEIS: A Tool for Estimating Biogenic Emissions", presented at the Emission Inventory Issues in the 1990's, Durham, NC, September 1991.

K.A. Baugues, "Mobile Source Emission Factors: Hourly Versus Daily", presented at the Emission Inventory Issues in the 1990's, Durham, NC, September 1991.

T. Pierce and K. Baugues, User's Guide to the Personal Computer Version of the Biogenic Emissions Inventory System (PC-BEIS), EPA-450/4-91-017, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 1991.

K.A. Baugues, "Reconciling Differences Between Ambient and Emission Inventory Derived NMOC/NO_x Ratios: Implications for Emission Inventories", presented at the 84th Annual Meeting of the Air & Waste Management Association, Vancouver, BC, June 1991.

E.L. Meyer, N.C. Possiel, D.C. Doll, K.A. Baugues and K.W. Baldrige, "A Summary of ROMNET Results and Outputs", presented at the Seventh Joint Conference on Applications of Air Pollution Meteorology with AWMA, New Orleans, LA, January 1991.

N. Possiel, D. Doll, K. Baugues, R. Wayland and E. Baldrige, "Impacts of Regional Control Strategies on Ozone in the Northeast United States", presented at the 83rd Annual Meeting of the Air & Waste Management Association, Pittsburgh, PA, June 1990.

E. L. Meyer, Jr. and K. A. Baugues, Consideration of Transported Ozone and Precursors and Their Use in EKMA, EPA-450/4-89-010, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 1989.

K. Baugues, User's Manual for OZIPM4 (Ozone Isopleth Plotting with Optional Mechanisms - Volume 2: Computer Code), EPA-450/4-89-009b, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 1989.

K. Baugues, User's Manual for OZIPM4 (Ozone Isopleth Plotting with Optional Mechanisms) - Volume 1, EPA-450/4-89-009a, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 1989.

K. Baugues, Procedures for Applying City-specific EKMA, EPA-450/4-89-012, U.S. Environmental Protection Agency, Research Triangle Park, NC, July 1989.

W. Battye, J. Langstaff, M. Smith, N. Possiel, E. Meyer, Jr. and K. Baugues, "Regional Ozone Modeling for Northeast Transport-Development of a Base Year Emissions Inventory", presented at the 82nd Annual Meeting of the Air & Waste Management Association, Anaheim, CA, June 1989.

K. Baugues, A PC Based System for Generating EKMA Input Files, EPA-450/4-88-016, U.S. Environmental Protection Agency, Research Triangle Park, NC, November 1988.

K. A. Baugues, "Sensitivity of OZIPM4/CB4 to Variations in Carbon Monoxide Inputs", presented at the 51st Annual Meeting of the Air Pollution Control Association, Dallas, TX, June 1988.

K. A., Baugues and E. L. Meyer, Jr., "A Procedure for Addressing Overwhelming Transport in Urbanscale Model Applications for Ozone", presented at the 51st Annual Meeting of the Air Pollution Control Ass ———, Dallas, TX, June 1988.

H. Hogo, M. W. Gery, K. A. Baugues and E. L. Meyer, Jr., "Sensitivity Analysis of the Effects of EKMA Input Parameters on VOC Control Requirements", presented at the APCA Specialty Conference, The Scientific and Technical Issues Facing Post-1987 Ozone Control Strategies, Hartford, CT, November 1987.

K. A. Baugues, A Review of NMOC, NO_x and NMOC/NO_x Ratios Measured in 1984 and 1985, EPA-450/4-86-015, U.S. Environmental Protection Agency, Research Triangle Park, NC, September 1986.

K. A. Baugues, "Results of Recent Non-methane Hydrocarbon Measurements", presented at the 79th Annual Meeting of the Air Pollution Control Association, Minneapolis, MN, June 1986.

Roy A. Paul, K. A. Baugues, G. L. Gipson and E. L. Meyer, Jr., "Estimation of Design Values in Overlapping Airsheds", presented at the 78th Annual Meeting of the Air Pollution Control Association, Detroit, MI, June 1985.

K. A. Baugues, "The Role of Calm Winds in Dispersion Estimates", included in the proceedings of the Third Joint Conference on Application of Air Pollution Meteorology, San Antonio, TX, January 1982.

K. Baugues, R. Raufer and J. Schramuk, Technical Support Document: Analysis of Ambient Air Quality Levels of Lead in East Helena, Montana, Contract No. 68-02-2550, Task Order 3, ETA Engineering Inc., Westmont, IL, November 1980.

K. Baugues, R. Raufer and J. Schramuk, Technical Support Document: Analysis of Ambient Air Quality Levels of Lead in Anaconda, Montana, Contract No. 68-02-2550, Task Order 3, ETA Engineering Inc., Westmont, IL, November 1980.

R. K. Raufer and K. A. Baugues, "The Development of State Implementation Plans for Lead", presented at the 73rd Annual Meeting of the Air Pollution Control Association, Montreal, Canada, June 1980.

R. Raufer, D. Kuhanek, A. Jirik, K. Baugues, J. Schramuk and J. Burnham, National Commission of Air Quality Twin Cities/St. Cloud Regional Study: The State Implementation Plan Process, Contract No. 12-AQ-7705, ETA Engineering Inc., Westmont, IL, June 1980.

K. Baugues and R. Raufer, Technical Support Document: Attainment of the Lead Standard in Denver, Colorado, Contract No. 69-02-2550, Task Order No. 2, ETA Engineering Inc., Westmont, IL, June 1980.

K. Baugues and R. Raufer, Technical Support Document: Attainment of the Lead Standard in Pueblo, Colorado, Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, May 1980.

K. Baugues and R. Raufer, Addendum to Lead Emission Inventory of Stationary Sources in Colorado, Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, May 1980.

K. Baugues and R. Raufer, Technical Support Document: Attainment of the Ambient Air Quality Standard of Lead in Grand Junction, Colorado, Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, May 1980.

K. Baugues and R. Raufer, Technical Support Document for the State of Minnesota (Minneapolis Area) - Site 360, Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, March 1980.

K. Baugues and R. Raufer, Technical Support Document for the State of Indiana (East Chicago Area), Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, March 1980.

K. Baugues and R. Raufer, Technical Support Document for the State of Minnesota (St. Louis Park Area), Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, March 1980.

K. Baugues and R. Raufer, Technical Support Document: Summary of Lead Air Quality Data for the State of Indiana, Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, March 1980.

R. Raufer and K. Baugues, Technical Support Document: Analysis of Vehicular Emissions in the Vicinity of Minneapolis Site 941, Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, December 1979.

R. Raufer and K. Baugues, Technical Support Document for the Vehicular Lead Analysis for the State on Indiana (Jeffersonville Area), Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, October 1979.

R. Raufer and K. Baugues, Technical Support Document or the Vehicular Lead Analysis for the State of Indiana (Hammond —), Contract No. 68-02-2888, Work Assignment No. 2, ETA Engineering Inc., Westmont, IL, October 1979.

S. K. Mukherji and K. A. Baugues, "Air Impact Review for New Sources", presented at the 17th Annual Purdue Air Quality Conference, W. Lafayette, IN, May 1979.

S. K. Mukherji, L. Shumway, K. A. Baugues and H. D. Williams, "Rural Fugitive Dust Impact on an Urban Area", presented at the 71st Annual Meeting of the Air Pollution Control Association, Houston, TX, June 1978.

K. A. Baugues, EIS/P&R - The Indiana System, Indiana Air Pollution Control Division, April 1978.

S. K. Mukherji, K. A. Baugues, G. W. Enderson and H. D. Williams, "Assessment of Ambient SO₂ Loading by a Power Plant Complex", presented at the 69th Annual Meeting of the Air Pollution Control Association, Portland, OR, June 1976.

J. Eid, M. Bobb, G. W. Enderson and K. A. Baugues, Impact of the Clifty Creek Generating Station on Ambient Air Quality, Indiana Air Pollution Control Division, January 1975.