



OAK LEAF ENVIRONMENTAL INC.

RÉSUMÉ JEREMY G. HEIKEN

OVERVIEW

Jeremy G. Heiken is an emissions and air pollution control engineer. He is an expert in criteria pollutant, air toxics and GHG emission inventory development over the full spectrum of anthropogenic sources. He has directed on- and off-highway emissions computer model development for California and US federal agencies. Since 2001, he has provided the Canadian federal government with regulatory mobile source inventory guidance and specialized mobile source inventory software development. He has conducted multiple hands-on training events and workshops related to the use of the MOBILE, NONROAD and MOVES regulatory emissions models.

Mr. Heiken has prepared emission inventories at all levels of temporal and spatial scales including in support of hundreds of photochemical air quality model simulations. Examples include national, planning emission inventory development for Canada; facility-level inventories for airports, rail yards and oil sands mining/extraction operations; and US air quality planning efforts including Federal and State Implementation Plans.

Mr. Heiken's work has been used to support Expert Testimony in litigation efforts and to support official emission inventory modeling guidelines published by regulating agencies. He has completed independent Expert Peer Reviews of regulatory agency inventory methods for the commercial marine sector and for lifecycle analyses of conventional and renewable transportation fuels. He served as the Mobile Source Session Chair to the USEPA International Emission Inventory Conferences in 2010 and 2012. In February 2016, he was an invited participant to the Coordinating Research Council's A-98 Workshop to provide expert input into future research needs in emission inventory development – data, methods and software.

Mr. Heiken is also an expert in regulatory evaluation for the vehicle manufacturing, engine manufacturing and fuel production industries. He has worked on regulatory assessments, regulatory compliance, manufacturer product line planning and in-use fleet rule compliance (for fleet operators). He has worked on numerous projects looking at inventory impacts of tailpipe test programs, control technology implementation, fuel parameters, fuel blends, renewable fuels and alternative fuels. He has completed transportation fuel lifecycle analyses to support low-carbon fuel applications to California, USEPA and EU for dozens of U.S. ethanol production facilities.

Mr. Heiken's currently active projects include (1) heavy-duty I/M program evaluation for the Ontario Ministry of the Environment and Climate and (2) consulting services related to an off-road engine manufacturer's compliance planning.



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EDUCATION

1989, B.S., Chemical Engineering, University of California, San Diego

1995, Continuing Education in “Title V Permitting,” Air and Waste Management Association

1999, Continuing Education in “Combustion and Emissions for Engineers,” Society of Automotive Engineers

2015, Continuing Education in “Applied Environmental Statistics,” Practical Stats

COMPUTER/SOFTWARE SKILLS

Mr. Heiken has extensive experience operating the following environmental models/software: MOVES, MOBILE, EMFAC, Vision, NONROAD, OFFROAD, NMIM, EDMS, GREET, GHGenius, Biograce, SPECIATE, Complex Model, Predictive Model, DTIM and EPS. He has good working knowledge of the following models/software: SMOKE, AERMOD, EGAS, DTIM, BEIS, ISC and CAL3QHC. He is a sophisticated user of numerous electronic databases and resources maintained by USEPA, California ARB, ECCC, USDA, EIA, FAA, BTS, BLS, BEA, FHWA, NREL, ORNL and the US Census.

Mr. Heiken primarily works in a PC environment (Windows/DOS operating systems) and has experience with Macintosh computers/software as well as computer workstations (Unix operating system). He is a skilled FORTRAN programmer; he also programs in Visual Basic and has SQL skills. He is proficient with MS Office software (Word, Access, Excel, Outlook and PowerPoint – through Versions 2016); he is experienced with other database and spreadsheet software.

EMPLOYMENT HISTORY

**2/2015 to Present President
Oak Leaf Environmental (Dexter, MI)**

Founded a new environmental consulting company specializing in air quality and emission inventory development. Clientele includes manufacturers, trade associations, government agencies and research institutions. Key completed projects include providing technical support for regulatory development and environmental software development for Environment and Climate Change Canada; an independent, comprehensive review of the MOVES2014 model for the Coordinating Research Council; and completion of a 2-day workshop/training on the use of the MOVES2014a model to Canadian stakeholders.



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4/2005 to 2/2015 Senior Engineer
Sierra Research (Ann Arbor, MI)

First employee selected to open the Michigan office. Responsible for criteria, toxic and GHG emission inventory development and regulatory impact analyses. Directed on- and off-highway emissions model development for Environment Canada. Completed projects looking at inventory impacts of renewable and alternative fuels. Completed low-carbon fuel applications and lifecycle analyses to California, USEPA and EU for ethanol production facilities. Completed inventory work for expert testimony in litigation efforts. Completed Expert Peer Reviews of commercial marine inventory methods and criteria pollutant & GHG lifecycle analyses of transportation fuels. Completed reviews of regulatory actions for impacted stakeholders including automobile manufacturers, engine manufacturers, equipment manufacturers and trade associations.

Completed extensive work with the MOVES model beginning in 2005 with a technical review of the early, unofficial draft MOVES2004 for the Alliance of Automobile Manufacturers. Has worked on subsequent technical reviews of MOVES inventory methods for affected industry stakeholders, USEPA and Environment Canada. Directed the creation of a Canadianized version of MOVES data input. Completed numerous applications of MOVES in macro-scale and micro-scale inventory evaluations. Initiated a project for a comprehensive, technical review of MOVES2014 for the Coordinating Research Council (the completion of this project occurred as a joint effort between Sierra Research and Oak Leaf Environmental).

1/2005 to 5/2005 Consultant
Self-Employed (Dexter, MI)

Completed a regulatory analysis for Environment Canada to evaluate the impact of a 2004 on-road motorcycle regulation on official planning inventories. Converted the analogous US regulation governing exhaust and permeation standards over to the Canadian context. Completed the update to the agency's emission factor modeling software (MOBILE6.2C) to address the enacted regulation.

4/1998 to 12/2004 Senior Analyst/Project Manager
Air Improvement Resource (Novi, MI)

Hired as a recognized expert in emissions inventory modeling. Provided regulatory impact analyses for engine manufacturing, vehicle manufacturing and refining industries in response to federal, state and local actions. Evaluated regulatory alternatives for use in negotiation processes for industry stakeholders. Prepared critical review of regulatory computer models and inventory guidance. Developed inventory methods and computer models for industrial and governmental clientele. Analyzed emissions, fuel and ambient test data for significant impact of analytical



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variables or emissions control programs. Project experience included the technical evaluation of the permeation emissions from ethanol-gasoline blends for both industry and government stakeholders; technical analyses in support of Southeast Michigan Council of Government's fine particulate matter and 8-hour ozone State Implementation Plan (SIP) efforts; off-highway model development for both the US EPA and California ARB; and official, regulatory emission inventory model development for the Canadian federal government.

**1/1995 to 4/1998 Senior Associate
Environ International Corporation (Novato, CA)**

Hired as part of a start-up team to establish a new air quality consulting office. Directed emission inventory efforts in support of photochemical air quality modeling, air quality management plans and regulatory impact assessments. Directed proposal efforts related to inventory development. Managed work coverage for emission inventory tasks and personnel. Project experience included directing the technical analyses to support the carbon monoxide (CO) and particulate matter (PM) SIP update for Medford, Oregon; the completion of a multi-state, episodic inventory assessment to address regions not covered by the EPA's Ozone Transport Assessment Group; authoring three studies for the mobile source committee of the EPA's Emission Inventory Improvement Program; and the completion of a locale-specific, ground-up speciated HC inventory for the Dallas-Ft. Worth non-attainment region.

**6/1989 to 1/1995 Staff Engineer/Senior Engineer
Systems Applications International, Div. of ICF Kaiser Engineers
(San Raphael, CA)**

Completed hundreds of chemically speciated, temporally allocated anthropogenic and biogenic inventories for use in photochemical model applications for dozens of domestic and international regions. Led analyses related to the on- and off-highway emission inventory source sectors. Project experience included leading the technical analysis for the automobile manufacturing industry behind the proposal to create the National Low Emission Vehicle (NLEV) program, and developing enhanced inventory processing modules to incorporate detailed motor vehicle emissions and hydrocarbon speciation data from the Auto/Oil Air Quality Improvement Research Program.

**6/1988 to 6/1989 Research Engineer
Science Applications International (San Diego, CA)**

Evaluated innovative technologies for Superfund hazardous waste clean-up. Completed research, theoretical effectiveness calculations, validations and technical reporting.



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SELECTED PUBLICATIONS/PRESENTATIONS (AUTHOR OR CO-AUTHOR)

“Automobile Inspection and Readjustment Program, Department of Public Health and Environment, Performance Evaluation,” prepared for the Colorado Office of the State Auditor, November 2017,
https://leg.colorado.gov/sites/default/files/documents/audits/1680p_air_program_performance_evaluation_november_2017.pdf.

“The USEPA MOVES Model: A Midcourse Review,” prepared for the 2017 International Emissions Inventory Conference, 16 August 2017,
<https://www.epa.gov/sites/production/files/2017-10/documents/heiken.pdf>.

“CRC Project No. E-116: Assessment of MOVES Model Evaporative Emission Inputs,” prepared for the Coordinating Research Council, June 2017,
https://crcao.org/reports/recentstudies2017/E-116/CRC_E-116_MOVES_Final%20Report_2017-06-14.pdf.

“Current State of GHG Reductions and Potential Future Strategies for the Light Duty Vehicle Transportation Sector in Canada,” prepared for Global Automakers of Canada, November 2016.

“Project No. ACRP 02-57: Reducing the Impact of Lead Emissions at Airports,” October 2016,
<http://www.trb.org/Main/Blurbs/174934.aspx>.

“CRC Project No. E-101: Review of EPA’s MOVES2014 Model,” prepared for the Coordinating Research Council, August 2016, http://crcao.com/reports/recentstudies2016/E-101/CRC%20E101%20Final%20Report_20160810.pdf.

MOVES2014 Workshop Day 1: “MOVES Overview”, “Modeling Architecture/Method”, “The MOVES Approach: Strengths, Remaining Areas of Uncertainty and Other Key Issues”, “MOVES Modeling Results”, “Nonroad Modeling”, prepared for the Canadian Fuels Association, June 2016.

MOVES2014 Workshop Day 2: “Day 2 Introduction & Overview”, “Lesson #1 MOVES Graphical User Interface”, “Lesson #2 Canadian Modeling Approaches”, “Lesson #3 Custom Domain Analysis”, “Lesson #4 Working with MOVES Output”, “Lesson #5 Best Practices Guidance”, “Additional Resources”, prepared for the Canadian Fuels Association, June 2016.

“Best Practices for Preparing Lead (Pb) Emission Inventories from Piston Powered Aircraft,” presentation and paper at USEPA 21st International Emission Inventory Conference. April 2015.



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“Quantifying Aircraft Lead Emissions at Airports,” 14th AAAE National Aviation Environmental Management Conference, April 2015

“Best Practices Guidebook for Preparing Lead (Pb) Emission Inventories from Piston Powered Aircraft,” prepared for Airport Cooperative Research Program, October 2014, <http://www.trb.org/Publications/Blurbs/172598.aspx>.

“ACRP 02-34: Quantifying Aircraft Lead Emissions at Airports,” prepared for Airport Cooperative Research Program, October 2014, <http://www.trb.org/Main/Blurbs/172599.aspx>.

“Assessment of the Emission Benefits of U.S. EPA’s Proposed Tier 3 Motor Vehicle Emission and Fuel Standards,” Sierra Research Report No. SR2013-06-01, prepared for American Petroleum Institute, June 23, 2013.

“Criteria Pollutant Impacts of Mid-Level Ethanol Blends (E15 and E20),” presentation at USEPA 20th International Emission Inventory Conference, August 16, 2012.

“Development of Inventory and Speciation Inputs for Ethanol Blends,” Sierra Research Report No. SR2012-05-01, prepared for Coordinating Research Council, May 2012.

“Midwest Rail Study, Modeled Near-Field Impacts of Emissions of Fine Particulate Matter from Railyard Activities,” *Journal of the Transportation Research Board*, Volume 2261, Railways 2011, pp. 106-114, 2011.

“Characterization and Breadth of Rail Yard Specific Inventories,” presentation and paper at USEPA 19th International Emission Inventory Conference. September 29, 2010.

“2010 AirCare Program Review, Phase 1,” Sierra Research Report No. SR2010-06-02, prepared for Translink, June 2010.

“Technical Review of EPA Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis for Non-GHG Pollutants,” Sierra Research Report No. SR2010-05-01, prepared for the American Petroleum Institute, May 2010.

“Effects of Gas Composition on Emissions from Heavy-Duty Natural Gas Engines,” Sierra Research Report No. SR2010-02-01, prepared for the Southern California Gas Company, February 2010.

“Effects of Gas Composition on Emissions from a Light-Duty Natural Gas Vehicle,” Sierra Research Report No. SR2009-11-01, prepared for the Southern California Gas Company, November 2009.



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“Technical Review of 2009 EPA Draft Regulatory Impact Analysis for Non-GHG Pollutants Due to Changes to the Renewable Fuel Standard,” Sierra Research Report No. SR2009-09-01, prepared for the American Petroleum Institute, September 2009.

“Rougemere Rail Yard Emission Inventory,” prepared for Lake Michigan Air Directors Consortium, August 3, 2009.

“Effects of Vapor Pressure, Oxygen Content, and Temperature on CO Exhaust Emissions,” Sierra Research Report No. SR2009-05-03, prepared for the Coordinating Research Council, May 2009.

“MOVES Case Study Analysis,” Sierra Research Report No. SR2009-05-01, prepared for the U.S. Environmental Protection Agency, May 2009.

“Technical Review of 2007 EPA Regulatory Impact Analysis Methodology for the Renewable Fuels Standard,” Sierra Research Report No. 2008-09-02, prepared for the American Petroleum Institute, September 2008.

“Peer Review of ‘Emission Inventories for Ocean-Going Vessels Using Category 3 Propulsion Engines In or Near the United States: Draft Technical Support Document,’” prepared for U.S. Environmental Protection Agency, January 23, 2008.

“Estimated Attainment Costs and Economic Impacts in Selected Regions of Proposed Revisions to the EPA 8-Hour Ozone Standard,” prepared for the National Association of Manufacturers, January 2008.

“Demonstration of the Necessity of Regulations Requiring 7.0 PSI RVP Gasoline in Clark County, Nevada as an Ozone Control Strategy,” prepared for Clark County Department of Air Quality and Environmental Management, November 9, 2007.

“Modeling Weekend and Weekday Ozone in Southeast Michigan,” prepared for National Renewable Energy Laboratory, June 27, 2007.

“Effectiveness of the California Light Duty Vehicle Regulations as Compared to Federal Regulations,” prepared for Alliance of Automobile Manufacturers, June 15, 2007.

“SEM-04-007 (Quebec Automobiles): Data for the Factual Record,” Sierra Research Report No. 2007-02-02, prepared for Commission for Environmental Cooperation of North America, February 2007.



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“Evaluation of Pennsylvania’s Implementation of California’s Greenhouse Gas Regulations on Criteria Pollutants and Precursor Emissions,” Sierra Research Report No. SR2006-04-01, prepared for Alliance of Automobile Manufacturers, April 12, 2006.

“Evaluation of Maine’s Adoption of California’s Greenhouse Gas Regulations on Criteria Pollutants and Precursor Emissions,” Sierra Research Report No. SR2005-10-01, prepared for the Alliance of Automobile Manufacturers, October 17, 2005.

“Evaluation of New Jersey’s Adoption of California’s Greenhouse Gas Regulations on Criteria Pollutants and Precursor Emissions,” Sierra Research Report No. SR2005-09-03, prepared for the Alliance of Automobile Manufacturers, September 30, 2005.

“Evaluation of Vermont’s Adoption of California’s Greenhouse Gas Regulations on Criteria Pollutants and Precursor Emissions,” Sierra Research Report No. SR2005-09-02, prepared for the Alliance of Automobile Manufacturers, September 19, 2005.

“Effectiveness Assessment of New Jersey Enhanced I/M Program Based on Analysis of In-Program Data,” Sierra Research Report No. SR2005-09-01, prepared for New Jersey Motor Vehicle Services, September 1, 2005.

“Evaluation of Connecticut’s Adoption of California’s Greenhouse Gas Regulations on Criteria Pollutants and Precursor Emissions,” Sierra Research Report No. SR2005-08-03, prepared for the Alliance of Automobile Manufacturers, August 26, 2005.

“AirCare Program Review – Phase 2,” Sierra Research Report No. SR2005-08-02, prepared for Greater Vancouver Transportation Authority, August 22, 2005.

“Evaluation of New York’s Adoption of California’s Greenhouse Gas Regulations on Criteria Pollutants and Precursor Emissions,” Sierra Research Report No. SR2005-07-04, prepared for the Alliance of Automobile Manufacturers, July 14, 2005.

“Issues Related to MOVES/GREET Integration,” Sierra Research Report No. SR2005-07-02, prepared for the American Petroleum Institute, July 12, 2005.

“Review of MOVES2004,” Sierra Research Report No. SR2005-07-01, prepared for the Alliance of Automobile Manufacturers, July 11, 2005.

“Emission Reductions from Changes to Gasoline and Diesel Specifications and Diesel Engine Retrofits in the Southeast Michigan Area,” Draft Final Report prepared for Southeast Michigan Council of Governments (SEMCOG), Alliance of Automobile Manufacturers, and American Petroleum Institute, December 2004.



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“Economic and Environmental Impacts of EPA’s 2007 Heavy-Duty Emissions Standards,” Draft Report, prepared for Engine Manufacturers Association, December 2004.

“Development of the Canadian Version of the MOBILE6.2 Model,” prepared for Environment Canada, Pollution Data Branch, September 2004.

“Review of Methods Used in Calculating Marine Vessel Emission Inventories,” prepared for Environment Canada, Pollution Data Branch, March 2004.

“Review of SEMCOG On-Road Inventory Method,” prepared for Southeast Michigan Council of Governments, March 2004.

“Review of Connecticut Fund for the Environment LEV II Studies,” prepared for the Alliance of Automobile Manufacturers, January 2004.

“Greenhouse Gas Emissions from Light-Duty Vehicles in Connecticut,” prepared for the Alliance of Automobile Manufacturers, November 2003.

“Modeling Weekday/Weekend Ozone Differences in the Los Angeles Region for 1997,” *J. Air & Waste Manag. Assoc.*, 53, pp. 864-870, July 2003.

“Evaluation of PuriNOxTM Test Data and Estimated Benefits on Centrally-Fueled Fleets Operating in the Sacramento and South Coast Air Basins,” prepared for Lubrizol Corporation, March 2003.

“Peer Review of ‘Commercial Marine Emission Inventory Development,’” prepared for the U.S. Environmental Protection Agency, Office of Transportation and Air Quality, January 2003.

“Impact of Ethanol Containing Gasoline on Saskatchewan Emission Inventories, prepared for the Canadian Petroleum Products Institute, January 2003.

“Review of LEV II MOBILE6 modeling inputs,” prepared for the U.S. Environmental Protection Agency, Office of Transportation and Air Quality, October 2002.

“Review of Draft MOBILE6.2 HC Toxic Emission Factors from Diesel-Powered Vehicles,” prepared for the Engine Manufacturers Association and the Alliance of Automobile Manufacturers, October 2002.

“Review of Draft MOBILE6.2 HC Toxic Emission Factors from Gasoline-Powered Vehicles,” prepared for the Engine Manufacturers Association and the Alliance of Automobile Manufacturers, November 2002.



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“Off-Highway Regulatory Model Diesel Fuel Corrections,” prepared for the American Petroleum Institute, June 2002.

“Emissions of Air Toxics from On-Highway Sources in Canada, Estimated Impacts of Various Vehicle and Fuel Control Strategies,” prepared for Environment Canada, Pollution Data Branch, March 2002.

"Vehicle Exhaust Emissions Benefit from a Regulatory Cap in Gasoline Distillation Index," SAE Technical Paper 2001-01-1963, May 2001.

“Review and Commentary on EPA’s Mobile Source Toxics Analysis,” prepared for the Alliance of Automobile Manufacturers, April 2000.

“Investigation of Emission Factors in the California EMFAC7G Model,” prepared for the Coordinating Research Council, 1999.

“1999 Audit of the Colorado AIR Program,” prepared for the Office of the State Auditor, November 1999.

“The Rogue Valley, Oregon Air Quality Planning Experience,” Conference Proceeding Paper for *Transportation, Land Use, and Air Quality: Making the Connection*, American Society of Civil Engineers, pp. 479-488, May 1998.

“Revision of Light-Duty Vehicle Emission Inventories Using Real-World Measurements - Auto/Oil Program, Phase II,” *J. Air & Waste Management Association*, April 1998.

“Performance Audit of the Colorado AIR Program,” prepared for the Office of the State Auditor, March 1998.

“Speciated VOC Emissions for the Dallas/Fort Worth Nonattainment Area.” Prepared for the Texas Natural Resources Conservation Commission, 1997.

“CAAA Section 112(k) -- Emissions Review and Policy Implications for American Petroleum Institute,” prepared for American Petroleum Institute, 1997

“Improved Procedures to Demonstrate Project Level for Conformity,” prepared for Colorado Department of Transportation, 1997.

“Guidance for Estimating Lawn and Garden Equipment Activity Levels,” prepared for the U.S. Environmental Protection Agency, Office of Mobile Sources, 1997.



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“Techniques for Improving Project Level Conformity Analyses in the Puget Sound Metropolitan Area,” prepared for Puget Sound Air Pollution Control Agency, 1997.

“User’s Guide for the National Nonroad Emissions Model Beta Version,” prepared for the U.S. Environmental Protection Agency, 1997.

“Future-Year Boundary Conditions for Urban Airshed Modeling for the State of Texas,” prepared for Texas Natural Resource Conservation Commission, 1996.

“Mobile Source Emissions Inventory Evaluation in the Metropolitan Denver Region,” prepared for the Denver Regional Air Quality Council, 1996.

“Methodology for Gathering Locality-Specific Emissions Inventory Data,” prepared for U.S. EPA, Office of Mobile Sources, 1995.

“NOx Emissions Benefits Associated with Use of MMT in Canadian Gasoline,” prepared for Ethyl Canada Incorporated, 1995.

“Environmental Data Base System for NUMMI’s BAAQMD and CAAA Title V Requirements,” prepared for New United Motor Manufacturing, 1995.

“Emissions Benefit Analysis of Alternatives to the California Zero Emission Vehicle (ZEV) Mandate,” prepared for American Automobile Manufacturers Association, 1994.

“The Federal Low Emission Vehicle Program: VOC and NOx Emission Benefits in the Northeast,” prepared for General Motors Corporation, 1994.

“Investigation of MOBILE5a Emission Factors,” prepared for American Petroleum Institute. 1994.

“Evaluation of Mobile Source Emission Control Cost-Effectiveness for Minneapolis-St. Paul,” prepared for the Minnesota Air Pollution Control Agency, 1994.

“Methodologies for Estimating Emission and Travel Activity Effects of TCMs,” prepared for U.S. EPA, Office of Mobile Sources, 1994.

“Methodology for Modeling Cumulative Risks of Air Toxics,” prepared for U.S. EPA, Office of Policy Analysis, 1994.

“City of Coronado Third and Fourth Street Corridor Air Quality Study,” prepared for City of Coronado, California, 1993.



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“Emission Benefits of Electric Vehicles in the Pacific Gas and Electric Service Territory,” prepared for Pacific Gas & Electric, 1993.

“Emission Benefits of Electric Vehicles in the San Diego Gas & Electric Service Territory,” prepared for San Diego Gas and Electric, 1993.

“Development of Specifications for a Nonroad Emissions Model,” prepared for Environmental Protection Agency, Office of Mobile Sources, 1993.

“Review of E.H. Pechan and Associates Emissions Analysis of the LEV Program in the Mid-Atlantic States,” prepared for General Motors Corporation, Environmental Activities Staff, 1993.

“Comparison of Remote Sensing Data and Vehicle Emissions Models: the Proportion of Emissions from High Emitting Vehicles,” paper and presentation at the Air & Waste Management Association, 85th Annual Meeting, June 1992.

“User's Guide to PART5: A Program for Calculating Particle Emissions from Motor Vehicles,” prepared for Environmental Protection Agency, Office of Mobile Sources, 1992.

“Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone,” EPA-450/4-91-014, prepared for Environmental Protection Agency, 1991.

“Assessment of Computer Models for Estimating Vehicle Emission Factors,” prepared for Coordinating Research Council, 1991.

“Transportation Control Measure Analysis Procedures,” prepared for California Air Resources Board, 1991.

“Carbon Monoxide Air Quality Modeling of the Phoenix Metropolitan Area in Support of the Federal Implementation Plan,” prepared for Environmental Protection Agency, 1991.

“Formaldehyde and Methanol Concentrations for Alternative Methanol Vehicle Scenarios,” prepared for the Coordinating Research Council, 1990.

“Application of the Urban Airshed Model to the South Coast Air Basin,” prepared for Environmental Protection Agency, 1991.

“Emission Changes Associated with the Use of a Reformulated Exxon Premium Unleaded Fuel in Los Angeles, San Francisco, and Sacramento,” prepared for Marketing Technical Services, Exxon Company, 1990.