

# CHRISTIAN LINDHJEM

## Senior Manager 10

Dr. Christian E. Lindhjem is an expert on emissions from highway and non-road vehicles, engines and fuels. Prior to joining Ramboll as ENVIRON, Chris' work at USEPA's Office of Transportation and Air Quality included on- and off-road mobile source regulation development, emission measurements and analysis, emission control strategies and emission inventory modeling, such as regulated pollutants and chemical compositional analysis to estimate toxic and other emissions. Chris has evaluated a broad range local and national mobile source emission issues. These include emission estimates and potential emission reductions from a variety of planned or demonstrated control strategies for on-road gasoline and heavy-duty diesel vehicles, as well as off-road equipment. He works with local, regional and national officials and private clients to improve on- and off-road emission inventories for regional evaluation in addition to individual facilities, such as ports, rail yards and metropolitan areas.



### CAREER

1990-1998

**Engineer, U.S. Environmental Protection Agency (EPA), Ann Arbor, MI**

- Nonroad Mobile Emissions
- Highway Mobile Emissions Model
- Engine Testing Project Management
- Clean Fuels Development

1988-1990

**Research Engineer, Westvaco Corporation, Laurel Research Center, Laurel, MD**

- Designed coating formulations and products for the fine papers division
- Developed measurable product quality criteria and mechanisms of in-use deterioration of our products during printing.
- Determined rheological failures of and developed improved coating formulations.

### EDUCATION

1983-1987

**PhD, Chemical Engineering**

Rensselaer Polytechnic Institute, Troy, NY, United States

1980-1981

**MS, Chemical Engineering**

University of Michigan, Ann Arbor, MI, United States

### CONTACT INFORMATION

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773 San Marin Drive  
Suite 2115  
Novato, CA 94998  
United States of America

1976-1980

**BS, Chemical Engineering; BS, Chemistry**

Rose-Hulman Institute of Technology, Terre Haute, IN, United States

## LANGUAGE SKILLS

English, German

## PROJECTS

### Commercial Marine, Rail, and Intermodal Emissions Evaluations

- Conducted in depth analysis and method formulation to revise locomotive and commercial marine emissions inventories for ports and railroads, states, and national agencies including those for the States of Arkansas, Illinois, Indiana, Michigan, Ohio, Texas, Wisconsin, and Wyoming and the metropolitan areas of Kansas City and Boise. We used Automatic Information System (AIS) data to prepare grid scale emissions inventories from large ocean-going vessels commercial marine engines for the State of Texas. Also, we provided EPA similar grid level estimates by combining near port ship channels and open-ocean emissions by route. Provided detailed grid level rail locomotive emissions by rail link using national transportation links identified by GIS shapefiles for Kansas and Texas. We prepared detailed Port air emission inventories for Port of Oakland, San Francisco, and San Diego combining detailed ship, harbour craft, cargo handling equipment, drayage trucking, and rail locomotive activity.

### Off-Road Emission Inventories

- Provided service to state agencies by improving air emissions inventories from all nonroad mobile sources. Conducted in-depth locomotive and other emissions evaluations for BNSF railyards in California in preparation for dispersion modeling impact analysis on the local community. For the Lake Michigan Air Directors Consortium (LADCO), a plan was developed and implemented for revising and developing activity estimates for all off-road emission sources. Prepared revised emissions inventories some categories or all nonroad (including aircraft, commercial marine, and locomotive sources) for the States of Arizona, Kansas, Texas, Arkansas, Oklahoma, Wyoming, Wisconsin, Illinois, Indiana, Michigan, Ohio, New Jersey, and the Western Regional Air Partnership (WRAP). Assisted EPA in improvements to the NONROAD model for off-road emissions estimation including for instance detailed technical comparisons of EPA and CARB models for estimating emissions from nonroad mobile sources

### On-Road Emission Inventories

- Managed projects to estimate metropolitan area and project level emissions estimates using the EPA MOVES and California ARB EMFAC models. Managed projects to incorporate CONCEPT link level modeling for Chicago, Cleveland, Cincinnati, Denver, Detroit, and Atlanta including MOVES model adjustments and vehicle volume and mix of heavy and light-duty vehicles adjusted by time of data and road type. Performed evaluations of the on-road vehicle mix and vehicle weight data from Automatic Traffic Recorders to better estimate on-road emissions for EPA, Illinois, Ohio, Wisconsin, and Minnesota. Led programs to develop new strategies and uses for alternative data to evaluate on-road vehicle emissions for EPA and the Coordinating Research Council in preparation of the MOVES model.

### On and Off-Road Mobile Source Control Strategies

- Provided detailed technical analyses and planning and day to day support of on-road and off-road mobile source control strategies for local and state government agencies including Houston-Galveston Area Council (HGAC), the East Texas Council of Governments (ETCOG), North Central Council of Governments (NCTCOG), and the Texas Commission on Environmental Quality (TCEQ). Also I have and continue to assist in revisions/updates to the mobile source emission inventory such as in Colorado, Chicago and other Midwest metropolitan regions, and Las Vegas. Provided the plan and technical guidance for the HGAC Voluntary Mobile Source Emission Reduction Program (VMEP) including marketing and online database and interactive programs, and reviews and evaluation of the Texas Emission Reduction PLAN (TERP) for the Houston Advanced Research Center (HARC).

### Mobile Source Emissions Air Quality Impact Evaluation

- Providing limited and innovative plans to evaluate and mitigate mobile source emissions at a project level for specific facilities and locations. Provided technical support for estimating on-road emissions

and spatial, temporal, and exhaust characteristics to evaluate air quality impacts at intersections for General Conformity and State Implementation Plans.

#### **Chemical Constituents of Mobile Source Emissions**

- I performed literature review and data evaluation of the chemical constituents including photochemically active and potential toxic components of exhaust and evaporative vehicle and offroad equipment emissions for the EPA and other clients. We estimated the emission reduction potential and impacts on air quality and toxicity from replacing diesel with biodiesel fuel in heavy-duty diesel vehicles and gasoline and diesel additives and alternative fuels.

#### **Scientific Emissions Research and Analysis**

- Performed scientific evaluation of emission modeling methods such as critically reviewing evaporative emissions estimates in MOVES and an extensive report (E-68) for the Coordinating Research Council (CRC) of EPA MOVES modeling framework. The CRC project followed and preceded work for EPA to develop and executed methods using on-board emissions monitor and laboratory data to estimate emissions from onroad and offroad vehicles and equipment using driving behavior and emissions related the physical and operating parameters of the vehicle or engine.

### **PUBLICATIONS**

2017

#### **Ocean-Going Tanker Vessel Lightering Emissions in the Gulf of Mexico**

Prepared for the Texas Council on Environmental Quality (TCEQ) June

Prepared by: Timothy Sturtz, Maria Zatko, Chris Lindhjem, and Greg Yarwood

2016

#### **Port of Oakland 2015 Seaport Air Emissions Inventory**

Prepared for the Port of Oakland, October

Prepared by: Chris Lindhjem, Till Stoeckenius, John Grant, Lit Chan, James King, Rajashi Parikh

2016

#### **Transportation-Related Multi-Pollutant Emission Reduction Measures Summary**

Prepared for the Houston-Galveston Area Council, October

Prepared by Christian Lindhjem and Barbara Joy

2016

#### **Source Apportionment of Emissions from Light-duty Gasoline Vehicles and Other Sources in the United States for Ozone and Particulate Matter.**

Journal of the Air & Waste Management Association, 66, 2, 98-119.

Authors: Vijayaraghavan, K., C. Lindhjem, B. Koo, A. DenBleyker, E. Tai, T. Shah, Y. Alvarez, G. Yarwood.

2016

#### **Transportation-Related Multi-Pollutant Emission Reduction Measures**

Prepared for the Houston-Galveston Area Council, October

Authors: Christian Lindhjem and Barbara Joy

2015

#### **Source Apportionment of Emissions from Light Duty Gasoline Vehicles and Other Sources in the United States for Ozone and Particulate Matter**

Journal of the Air and Waste Management Association, (1995) 66(2), November

Authors: Vijayaraghavan, K., C. Lindhjem, B. Koo, A. DenBleyker, E. Tai, T. Shah, Y. Alvarez, G. Yarwood.

2015

**Final Report Link-based Modeling Emissions Inventory of Marine Vessels (Ocean Going Vessels) in Transit and at Anchor in the Gulf of Mexico**

Prepared for the Texas Commission on Environmental Quality, July  
Authors: Timothy M. Sturtz, Christian Lindhjem, Lit Chan, and Greg Yarwood

2015

**Port of San Francisco Seaport Air Emissions Inventory 2013**

Prepared for the Port of San Francisco, February  
Authors: Christian Lindhjem

2014

**Trends in On-Road Vehicle Emissions and Ambient Air Quality in Atlanta, Georgia, USA from the Late 1990s through 2009.**

Journal of Air and Waste Management Association, 64 (7): 808-16.  
Authors: Vijayaraghavan, K., A. DenBleyker, L. Ma, C. Lindhjem, G. Yarwood.

2014

**Port of San Diego 2012 Maritime Air Emissions Inventory**

Prepared for the San Diego Unified Port District  
Authors: C. Lindhjem, D. Daugherty, and T. Sturtz

2013

**Evaluation of Mobile Source Control Measures.**

Prepared for the Houston-Galveston Area Council  
Authors: Lindhjem, C., A. DenBleyker.

2013

**Port of Oakland 2012 Seaport Air Emissions Inventory.**

Prepared for the Port of Oakland. [http://www.portofoakland.com/environment/seaport\\_12.aspx](http://www.portofoakland.com/environment/seaport_12.aspx)  
Authors: Lindhjem C. and T. Stoeckenius.

2013

**Improving Emission Estimates and Understanding of Pollutant Dispersal for Impact Analysis of Beach Nourishment and Coastal Restoration Projects.**

Prepared for the U.S. Department of the Interior, Bureau Ocean Energy Management (BOEM), March.  
Authors: Stoeckenius, T., C. Lindhjem, T. Shah.

2013

**Identification of Potential Emission Reduction Strategies for the Heart of Texas Council of Governments 6-County Area.**

Prepared for Heart of Texas Council of Governments, Waco, TX.  
Authors: DenBleyker, A., Y. Alvarez, S. Kembell-Cook, C. Lindhjem, A. Bar-Ilan, G. Yarwood.

2012

**Impact of Meteorology and Anthropogenic Emissions on the Local and Regional Ozone Weekend Effect in Midwestern US.**

Atmos. Environ., V57, pp 13-21, September.  
Authors: Koo, B., J. Jung, A. K. Pollack, C. Lindhjem, M. Jimenez, G. Yarwood.

2012

**NONROAD Growth & Activity Update.**

Draft Final report prepared for USEPA Office of Transportation and Air Quality. August.

Authors: Lindhjem, C.E, J. Grant, and L. Ma.

2012

**Effects of Improved Spatial and Temporal Modeling of On-Road Vehicle Emissions.**

J. Air Waste Manage. Assoc., 62, pp. 471-484.

Authors: Lindhjem C.E. A.K. Pollack, A. DenBleyker, and S.L. Shaw.

2012

**Guidelines for Assessment of Equivalencies of Averaging and Fuel Efficiency Measures to Sulphur Emission Control Standards under Annex VI to the MARPOL Convention.**

Prepared for Transport Canada, Ottawa, Ontario. March.

Authors: ENVIRON EC, Stoeckenius, T. and C.E. Lindhjem.

2012

**Evaluation of Mobile Source Control Strategies for the Houston-Galveston-Brazoria State Implementation Plan.**

Prepared for the Houston-Galveston Area Council (H-GAC). August.

Authors: Lindhjem, C.E. A. DenBleyker, B. Joy and H. Barbour.

2012

**Modeling Framework for Evaporative Emissions.**

Prepared for USEPA Office of Transportation and Air Quality. September.

Authors: Lindhjem, C.E.

2012

**Dredge Project Emissions Calculator: Emissions Calculation Methodology.**

Prepared for Bureau of Ocean Energy Management. March.

Authors: Lindhjem, C.E. and T.E. Stoeckenius.

2012

**Mobile Source Emission Models with On-Road Traffic Tunnel and Remote Sensing Measurements.**

Authors: Fujita, E.M., D.E. Campbell, B. Zielinska, J.C. Chow, C.E. Lindhjem, A. DenBleyker, G.A. Bishop, B.G. Schuchmann, D.H. Stedman & D.R. Lawson.

2012

**Calculation of Weighted Average Vessel Emissions.**

Prepared for Cruise Line International Association, Washington DC. March.

Authors: Stoeckenius, T.E. and C.E. Lindhjem.

2012

**Effects of Light Duty Gasoline Vehicle Emission Standards in the United States on Ozone and Particulate Matter.**

Atmos. Environ., V60, pp 109-120.

Authors: Vijayaraghavan, K., C. Lindhjem, A. DenBleyker, U. Nopmongkol, J. Grant, E. Tai, G. Yarwood

2012

**Temporal and Spatial Detail in Mobile Source Emission Inventories for Regional Air Quality Modeling.**

EPA International Emission Inventory Conference, Tampa, FL. August.

Authors: DenBleyker, A., C. E. Lindhjem, C. Loomis, and H. Dilley.

2011

**CONCEPT MV MOVES Interface Improvement | Also, "2010 Transportation Data for Six Networks Processed for CONCEPT" and "National Interstate and State Highway Link-Level Data Processed for CONCEPT.**

Prepared for the Lake Michigan Air Directors Consortium, October.

Authors: Jimenez, M., A. DenBleyker, and C.E. Lindhjem.

2011

**Effects of Light-duty Vehicle Emissions on Ozone and PM with Past, Present, and Future Controls.**

Draft Final report prepared for Coordinating Research Council, Inc. December.

Authors: Vijayaraghavan, K., G. Yarwood, C.E. Lindhjem, A. DenBleyker, U. Nopmongcol, J. Grant, E. Tai, T. Sakulyanontvittaya, and J. Johnson.

2010

**Technical Approach to Great Lakes Vessel Emissions Calculations and Results.**

Final report prepared for Canadian Shipowners Association, Ottawa, Ontario. December.

Authors: Lindhjem, C. E. L. Ma, T. E. Stoeckenius.

2010

**Development of Drivers and Post-Processing Scripts to Incorporate MOVES2010 Emission Factors with the SMOKE Emissions Model.**

ENVIRON International Corporation. 19th International Emission Inventory Conference, San Antonio, TX. September.

Authors: Lindhjem C.E. A. DenBleyker, M. Jimenez and A. K. Pollack.

2010

**Use of MOVES2010 in Link Level On-Road Vehicle Emissions Modeling Using CONCEPT-MV.**

ENVIRON International Corporation, CA; Z. Li, Clark County, Las Vegas, NV. 19th International Emission Inventory Conference, San Antonio, TX. September.

Authors: Lindhjem C.E. A. DenBleyker, M. Jimenez, J. Haasbeek, A. K. Pollack.

2010

**Final Emission Inventory Report: Data Population of Air System for Hawaii's Emissions Data (AirSHED).**

Prepared for Hawaii Department of Health, Clean Air Branch, Honolulu, HI. April.

Authors: Grant, J., A. Pollack, R. Parikh, C.E. Lindhjem, S. Kembell-Cook, A. Bar-Ilan.

2010

**Development of Emission Estimates for Locomotives in the Kansas City Metropolitan Statistical Area.**

Prepared for Kansas Department of Health and Environment (KDHE), May.

Authors: Lindhjem, C.E. and T.M.Sturtz.

2010

**Support for EPA PM NAAQS Exposure Assessment: Link Level On-Road Emissions For Three United States Cities Using CONCEPT-MV.**

Prepared for Karen Wesson EPA/EMAD, September.

Authors: DenBleyker, A., Jimenez, M., Lindhjem, C.E. Shepard, S., Richman, K., and Pollack, A.K.

2010

**Port of Oakland 2008 Seaport Air Emissions Inventory.**

Draft report prepared for Port of Oakland, CA. August.

Authors: Lindhjem, C., J. Grant, R. Parikh, and W. Sylte.

2010

**Implement Port of Houston's Current Inventory and Harmonize the Remaining 8-County Shipping Inventory for TCEQ Modeling**

Prepared for: Texas Commission on Environmental Quality, August.

Authors: Parker, L., Lindhjem, C.E. and others

2009

**Mobile Source Emissions: Adjustments to MOBILE6.**

19th CRC On-Road Vehicle Emissions Workshop. March.

Authors: Lindhjem, C.

2009

**Development of Link-Level Spatial Allocation Methodology for Line-Haul Locomotive Emissions in Texas.**

Prepared for Texas Commission on Environmental Quality, August.

Authors: Lindhjem, C.E. and T.M.Sturtz.

2009

**Development Of Modeling Inventory Factors for Mobile Source Particulate Organic Carbon and Semi-Volatile Organic Compound Emissions.**

Prepared for National Renewable Energy Laboratory, Lake Michigan Air Directors Consortium, and Mid-Atlantic Regional Air Management Association, October.

Authors: Lindhjem, C.E. Yarwood, G., Koo, B., Fujita, E. and Turner, J.

2008

**Evaluation of Mobile Source Control Strategies for the Houston-Galveston-Brazoria State Implementation Plan.**

Draft report. December.

Authors: Lindhjem, C.E.

2008

**Emission Profiles for EPA SPECIATE Database.**

Prepared for US EPA. January.

Authors: Lindhjem, C.E.

2008

**Emission Profiles for EPA SPECIATE Database, Part 2: EPAct FUELS.**

Prepared for EPA; Office of Transportation and Air Quality, Ann Arbor, MI. September.

Authors: Lindhjem, C.E.

2008

**San Bernardino Toxic Air Contaminant Emission Inventory.**

Prepared for BNSF Railway; other similar reports for the rail yards: Barstow, San Diego, Hobart, Commerce-Eastern, Commerce-Mechanical, Watson, Stockton, and Richmond. January.

Authors: Lindhjem, C.E. Souten, D., and S.Seum.

2008

**Port of Oakland Berthing Load Study.**

Prepared for the Port of Oakland, Oakland, CA. April.

Authors: Bar-Ilan, A., Lindhjem, C.E.

2007

**Massachusetts Diesel PM Emissions Reduction: Retrofit Technical Feasibility Analysis.**

Prepared for NESCAUM, Boston, MA. October.

Authors: Bar-Ilan, A., C. Chandler-Nogales, C. Lindhjem.

2007

**LADCO Nonroad Emission Inventory Project for Locomotive and Commercial Marine Emission Sources.**

Prepared for Lake Michigan Air Director Consortium by ENVIRON. February.

Authors: Lindhjem, C.E.

2007

**Port of Oakland 2005 Seaport Air Emissions Inventory.**

Prepared for the Port of Oakland, Available online at

<http://www.portofoakland.com/environm/airEmissions.asp>, August.

Authors: Lindhjem, C.E.

2006

**Los Angeles - Hobart Railyard Toxic Air Containment Emissions Inventory| "Commerce Eastern Railyard Toxic Air Containment Emissions." "Commerce Mechanical Railyard Toxic Air Containment Emissions." "Wilmington Watson Railyard Toxic Air Containment Emissions." Stockton Railyard Toxic Air Containment Emissions." "Richmond Railyard Toxic Air Containment Emissions." "Barstow Railyard Toxic Air Contain**

Prepared for BNSF Railway, Available Online at <http://www.arb.ca.gov/railyard/hra/hra.htm>

Authors: Lindhjem, C.E.

2006

**Evaluation Of Mobile Source Control Strategies For The Houston-Galveston-Brazoria State Implementation Plan.**

Prepared for the Houston-Galveston Area Council. May.

Authors: Lindhjem, C.E.

2005

**Estimation and Effects of Vehicle Mix on On-Road Emission Estimates.**

Air and Waste Management Association Emission Inventory Conference, Las Vegas, Nevada. April.

Authors: Lindhjem, C.E. and S. Shepard.

2004

**Development of WRAP MOBILE Source Emission Inventories**

Prepared for Western Governor's Association, Denver, Colorado. February.

Authors: Pollack, A. K., R. Chi, C.E. Lindhjem, C. Tran, P. Chandraker.

2004

**Cold Ironing Cost Effectiveness.**

Prepared for the Port of Long Beach by ENVIRON International Corporation, March.

Authors: ENVIRON.

2004

**Applying Humidity and Temperature Corrections to on and off-Road Mobile Source Emissions.**

Air & Waste Management Association Emission Inventory Conference, St. Petersburg, FL.

Authors: Lindhjem, C.E. L. Chan., A.K. Pollack, and C. Kite.

2004

**Development Work For Improved Heavy-Duty Vehicle Modeling Capability Data Mining FHWA Datasets Phase II: Final report.**

EPA Contract No. 68-C-02-022 Work Assignment No. 2-6 Prepared for Evelyn Sue Kimbrough, Atmospheric Protection Branch, Office of Research and Development, US EPA. September.

Authors: Lindhjem, C.E. S.Shepard.



2004

**Analysis of EPA's Draft Plan for Emissions Modeling in MOVES and MOVES GHG, Project E-68.**

Prepared for Coordinating Research Council, Inc. May.

Authors: Lindhjem, C.E. and Pollack, A.K.

2004

**LADCO/MPCA Total Volume And Vehicle Classification Temporal Profiles.**

Prepared for Lake Michigan Air Directors Consortium, September.

Authors: Lindhjem, C.E. S.Shepard, A.K Pollack.

2004

**Emission Control Technologies and Programs for Heavy-Duty Diesel Vehicle Fleets in North America.**

Paper No. 371. Air and Waste Management Association Annual Meeting, Indianapolis, IN.

Authors: Lindhjem, C.E. and L. Chan.

2004

**Humidity and Temperature Effects on On-road and Off-road Emissions and Ozone Formation (HARC Project H8B)**

Prepared for the Houston Advanced Research Center (HARC)

Authors: Lindhjem, C.E. and G.Yarwood

2003

**Updates to Off-Road Mobile Emissions for East Texas.**

Prepared for the East Texas Council of Governments. September.

Authors: Lindhjem, C.E. P. Chandraker.

2003

**Potential Control Measures for Reducing Visibility-Related Pollutants in Maricopa County.**

Prepared for Arizona Department of Environmental Quality. December.

Authors: Lindhjem, C.E. A. K. Pollack, R. Friesen, B. Sylte, D.Calkins, T. McGuire, D. Baldwin.

2003

**Evaluation of the US EPA MOBILE6 Highway Vehicle Emission Factory ModelEvaluation of the US EPA MOBILE6 Highway Vehicle Emission Factory Model.**

To be filled in

Authors: Lindhjem, C.E. A.K. Pollack, T.E. Stoerckenius, C. Tran, G. Mansell, M. Jimenez, G. Wilson, S.Coulter-Burke

2003

**CRC Project E-64 Evaluation of the U.S EPA MOBILE6 Highway Vehicle Emission Factor Model.**

Prepared for Coordinating Research Council, Inc., December.

Authors: Pollack, A. K., C.E. Lindhjem, T.E. Stoerckenius , C. Tran,G. Mansell, M. Jimenez, G. Wilson, and S. Coulter-Burke

2003

**Development Work for Improved Heavy-Duty Vehicle Modeling Capability.**

Prepared for Atmospheric Protection Branch; U.S. EPA, September.

Authors: Lindhjem, C.E. S. Shepard.

2003

**Literature Survey of Mobile Source Air Toxic Emission Studies.**

Prepared for Office of Transportation and Air Quality; U.S. EPA, September.

Authors: Lindhjem, C.E. M. Keinath, C. Tran.

2003

**Maricopa County 2002 Comprehensive Emission Inventory; For the Cap and Trade Oversight Committee.**

Prepared for Arizona Department of Environmental Quality. October.

Authors: Lindhjem, C.E. A. Pollack, C. Tran, T. Stoeckenius, R. J. Downing, R. Schindler, E. Raisanen, D. Konopka, R. Sedlacek.

2003

**Development Work For Improved Heavy-Duty Vehicle Modeling Capability, Phase I Final Report.**

US EPA Contract No. 68-C-02-022 Work Assignment No. 1-7, Prepared for Evelyn Sue Kimbrough, Atmospheric Protection Branch, Office of Research and Development, U.S. EPA. September.

Authors: Lindhjem, C.E. Shepard, S.

2002

**On-Board Data Analysis and Collection for the New Generation Model, PR-CI-01-12239.**

Prepared for U.S. EPA, Office of Transportation and Air Quality, Ann Arbor, MI. February.

Authors: Lindhjem, C.E. and Stoeckenius, T. .

2002

**Review of EPA Draft Report: Updating Fuel Economy Estimates in MOBILE6.3.**

Prepared for U.S. EPA, Office of Transportation and Air Quality. June.

Authors: Lindhjem, C.E.

2002

**Impact of Biodiesel Fuels on Air Quality and Human Health.**

Summary Report. Prepared for National Renewable Energy Laboratory. Golden, CO. November.

Authors: Lindhjem, C.E. R.E. Morris, A.K. Pollack, G.E. Mansell, Ph.D., Y. Jia, G. Wilson.

2002

**Commercial Marine Emission Inventory Development.**

Prepared for U.S. EPA, Office of Transportation and Air Quality., April.

Authors: Lindhjem, C.E.

2002

**Improving Local Air Emissions Inventories From Nonroad Sources.**

Prepared for Lake Michigan Air Director Consortium. November.

Authors: Lindhjem, C.E.

2001

**MOBILE6 Beta Testing.**

Prepared for U.S. EPA, Office of Transportation and Air Quality, Ann Arbor, MI. January.

Authors: Lindhjem, C.E. A.K. Pollack and R. Chi.

2001

**Comparison Of Highway Mobile Source Emissions Inventory From MOBILE1 Through MOBILE6.**

11th CRC On-Road Vehicle Emissions Workshop, San Diego, California, March.

Authors: Lindhjem, C.E. A.K. Pollack, R. Chi.

2000

**On-Road Motor Vehicle NOx Emissions Reduction Measures for the Sacramento Metropolitan Area.**

Prepared for the Sacramento Council of Governments. August.

Authors: Lindhjem, C.E. (with others).

2000

**Draft NONROAD Model Gasoline Consumption Estimates Comparison with Other Data Sources.**

U.S. EPA, October.

Authors: Lindhjem, C.E. C. Tran and A.K. Pollack.

2000

**Study of Air Quality Programs in Clark County, Nevada.**

Pursuant to Senate Bill 432, Chapter 529, Statutes of Nevada 1999. Prepared for Legislative Counsel Bureau. September.

Authors: Lindhjem, C.E. (with others).

2000

**Estimates of the Effect of the School Year on Vehicle Activity.**

Prepared for the Texas Natural Resource Conservation Commission. September.

Authors: Lindhjem, C.E.

2000

**NONROAD and OFFROAD Models: Recreational Marine Comparison.**

U.S. EPA, February.

Authors: Lindhjem, C.E.

2000

**NONROAD and OFFROAD Models: Comparison of Modeling Input Data for Compression-Ignition Engines.**

U.S. EPA, January.

Authors: Lindhjem, C.E.

2000

**NONROAD and OFFROAD Models: Recreational Equipment Comparison.**

U.S. EPA, October.

Authors: Lindhjem, C.E. A.K. Pollack.

2000

**NONROAD and OFFROAD Models: Small (<25 hp) Spark-Ignition Engine Exhaust Emissions.**

U.S. EPA, October.

Authors: Lindhjem, C.E.

2000

**Houston-Galveston Area Marine Vessel Emission Inventory.**

Prepared for the Port of Houston Authority and Texas Natural Resource Conservation Commission. June.

Authors: Lindhjem, C.E. (with others).

2000

**NONROAD and OFFROAD Models: Comparison of EPA and ARB Input Data for Emissions from Large Spark-Ignition Engines.**

U.S. EPA, September.

Authors: Lindhjem, C.E.

1999

**TNRCC Construction Equipment Emissions Project.**

Prepared for the Texas Natural Resources Conservation Commission. February.

Authors: Lindhjem, C.E. A.K. Pollack.

1999

**Control Measures for the Dallas-Ft. Worth.**

Prepared for the North Central Texas Council of Governments. September.

Authors: Lindhjem, C.E. (with others).

1999

**Heavy-Duty Nonroad Engine Activity and Emissions in the Northeast.**

Northeast States for Coordinated Air Use Management, August.

Authors: Lindhjem, C.E. Coralee Cooper.

1998

**ARB OFFROAD and EPA NONROAD Models: Comparison of Model Structures.**

U.S. EPA, December.

Authors: Lindhjem, C.E.

1998

**A Method for Comparing Transient NOx Emissions with Weighted Steady State Test Results.**

Society of Automotive Engineers, SAE-980408.

Authors: Lindhjem, C.E. D.M. Swain, C.J. Jackson, and G.J. Hoffman.

1998

**Evaluation of Lean NOx Reduction Catalysts for Controlling Emissions from Diesel Engines.**

Environmental Progress, pp 48.

Authors: Lindhjem, C.E. and D.A. Guerrieri.

1998

**Exhaust Emission Factors for Nonroad Engine Modeling--Spark Ignition.**

Report No. NR-010, Documentation Supporting EPA's Draft Release of the NONROAD Model. February.

Authors: Lindhjem, C.E. M. Beardsley, C. Harris.

1998

**Comparison of EPA NONROAD and ARB OFFROAD Models: Population Estimates and Allocation to Counties for Small (<25 hp) Spark Ignition (SI) Engines.**

U.S. EPA, December.

Authors: Lindhjem, C.E. A.K. Pollack.

1998

**Exhaust Emission Factors for Nonroad Engine Modeling--Compression-Ignition.**

Report No. NR-009, Documentation Supporting EPA's Draft Release of the NONROAD Model. February.

Authors: Lindhjem, C.E. M. Beardsley.

1997

**Heavy-Duty Diesel Emissions Modeling.**

Air & Waste Management Conference on Emission Inventory: Planning for the Future, RTP, NC. October.

Authors: Lindhjem, C.E.

1997

**Emission Rates from Highway and Nonroad Diesel Engines.**

World Car Conference, Riverside, CA. January.

Authors: Lindhjem, C.E.

1997

**Average Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling.**

EPA/OMS Report NR-005, Documentation Supporting EPA's Draft Release of the NONROAD Model. December.

Authors: Lindhjem, C.E. M. Beardsley.

1997

**Nonroad Engine Population Estimates.**

Report No. NR-006, Documentation Supporting EPA's Draft Release of the NONROAD Model. December.

Authors: Lindhjem, C.E.

1997

**Conversion Factors for Hydrocarbon Emission Components.**

Report No. NR-002, Documentation Supporting EPA's Draft Release of the NONROAD Model. November.

Authors: Lindhjem, C.E.

1997

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1991

**University of Michigan "Pollution Control for Chemical Engineers," Department of Chemical Engineering, Ann Arbor.**

1985-1987

**Rensselaer Polytechnic Institute "Air Pollution Control," Department of Chemical Engineering, Troy.**

**OTHER ACTIVITIES**

1995

**Ann Arbor**

EPA Bronze Medal for Commendable Service for Highway Heavy-Duty Engine Emission Reduction

1995

**Ann Arbor**

EPA Bronze Medal for Commendable Service for Nonroad Engine Emission Controls Development

1992

**Ann Arbor**

EPA Science Achievement Award in Air Quality

1991

**Ann Arbor**

EPA Silver Medal for Superior Service for Clean Fuels Development

**MEMBERSHIPS**

Air and Waste Management Association (AWMA)

National Cooperative Highway Research Program Panelist

EPA Mobile Source Technical Review Subcommittee for Nonroad Engine Emissions

Transportation Research Board Transportation and Air Quality Committee