



**CYNTHIA F. LOOMIS  
SENIOR SCIENTIST  
ALPINE GEOPHYSICS, LLC**

**EDUCATION:**

B.S. Mathematics and Computer Science, California State University, Sacramento, 1987.

**PROFESSIONAL EXPERIENCE:**

Senior Scientist, Alpine Geophysics, LLC, Arvada, CO, 1992 – Present.

Staff Scientist, Radian Corporation, Denver, CO, 1991-1992.

Group Leader, Radian Corporation, Sacramento, CA, 1988-1991.

Scientist, Radian Corporation, Sacramento, CA, 1987-1988.

**FIELDS OF EXPERIENCE:**

Ms. Loomis specializes in emissions inventory preparation and emissions modeling for regional and urban scale photochemical, haze and particulate modeling applications, environmental database design and implementation, and the statistical analysis of sampling data. She has experience using all of the major emissions modeling systems, including SMOKE, CONCEPT, EMS-2001, EMS-95, EMS-95/PM, GEMAP, EPS and FREDs. She also has extensive experience with a variety emissions development software packages used to support emissions modeling, including MOVES2010a, MOBILE6.2, MOBILE5, NONROAD, NMIM, BEIS3, EGAS4, and SPECIATE.

Her extensive experience includes the integration of mobile source modeling methodologies into emissions modeling systems, including the development of the on-road mobile source modeling components of both CONCEPT and EMS-2003. She was the project manager for the CONCEPT emissions modeling system development project, sponsored by LADCO, and one of the original developers of the EMS modeling systems. Currently, she is involved with the development of MOVES2010a based on-road motor vehicle inventories over the Southeastern US, Texas and Colorado.

**Emissions Inventory Development, Evaluation, Application, and Coordination**

SEMAP MOVES Emissions Inventory Development. As a subcontractor to Mactech, Ms Loomis is currently involved with the development of mobile source emissions for ten southeastern US states. This effort includes the development of appropriate MOVES2010a input files, assisting the states in the development of the appropriate input data, and execution of the SMOKE-MOVES integration tools.

Pennsylvania Biofuels. As a subcontractor to E.H. Pechan, Ms Loomis is managing an ambient air quality study to determine if the mandated volumes of biofuel sold or offered for sale in the Pennsylvania Commonwealth will achieve and maintain the NAAQS for ozone and fine particulate matter (PM<sub>2.5</sub>). Using SMOKE, MOBILE6.2, and CMAQ, she is developing and evaluating alternate scenarios for biodiesel penetration for 2008 and 2012 to determine the impact of ethanol and biodiesel fuel sales and alternatives on air quality.

Hong Kong Air Quality Modeling System. Ms Loomis is the Alpine Geophysics Project Manager for the development of an enhanced air quality modeling system for the Hong Kong Environmental Protection Department (EPD). As a subcontractor to ENVIRON, AG is responsible for the incorporation of the emissions modeling systems, including both CONCEPT and SMOKE alternatives. The modeling system options include MEGAN and BEIS capability, generation of emissions inputs for the CBM4, CB05 and SAPRC99 chemical mechanisms, and motor vehicle emission factor options generated by EMFAC and MOBILE6. Geophysical data used

for spatial allocation of emissions, temporal allocation factors and speciation profile data has also been reviewed, updated and incorporated into the modeling systems.

Denver SIP Modeling. Ms Loomis has prepared the emissions inventory and emissions modeling for the Denver Metropolitan Area (DMA) and adjacent regions 8-hour ozone modeling analysis in support of the development of an 8-hour ozone State Implementation Plan (SIP) and attainment demonstration. The Denver 8-Hour ozone SIP modeling includes emissions, meteorological and ozone simulations using a nested 36/12/4 km grid with the 4-km grid focused on the state of Colorado and including the DMA and vicinity. Key portions of the emissions development include on-road and off road fuel alternatives, and enhanced emissions speciation and spatial allocation for oil and gas emissions.

Ms Loomis was recently under contract to the Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) regional planning organization (RPO) to develop, model and review emissions inventories in support of VISTAS air quality modeling programs. This assignment encompasses the development of 2002, 2009, and 2018 inventories for VISTAS, including the development of national, annual on-road motor vehicle inventories utilizing MOBILE6 and SMOKE, CEM-based EGU emissions inventories, area and point source inventories utilizing NEI and locally updated emissions data, NONROAD based emissions estimates and projections for off-road mobile sources, BEIS3 biogenics, and wildfires.

Ms Loomis is currently working on the implementation of a SIP Strategy Comprehension Plan (SSCP) examining the components of an integrated 8-hr ozone and annual PM<sub>2.5</sub> modeling study for the five-state Upper Midwest region. The aim of the SSCP is to allow the Project Sponsors insight and assurance that best modeling practices are being utilized to identify effective emission reduction controls to address the residual nonattainment issues in this region and that if alternate and credible information are developed independently outside of the scope, timelines, or budgets of the RPO recommendation process that these data are introduced to the States in a constructive manner for consideration in SIP development timelines.

Ms Loomis recently provided assistance to Mid-Atlantic Regional Air Management Association (MARAMA) to provide revision, analysis, and adjustment of the 2002, 2009, 2012, and 2018 base case and control scenario emission estimates for the MANE-VU region.

Ms Loomis has recently provided emissions inventory development and modeling to a number of industrial groups, examining the effects of specific plant alterations, retrofits, and alternate control scenarios on local and regional air quality.

Ms Loomis has recently developed particulate inventories for national scale modeling, utilizing the EMS-2001/MOBILE6.2 modeling system. She is also involved in the development and QA of SIP quality inventories for particulate and photochemical modeling in California.

Ms. Loomis has been involved in, and developed inventories for, numerous recent projects examining the effects of the 1999 NO<sub>x</sub> SIP call budgets and investigating the impacts of budget alternatives, including alternate point, area, and on-road motor vehicle control strategies. These projects have utilized emissions data from a wide variety of sources including the OTAG emissions databases, the EPA's NEI and NET inventories, data acquired from state and local jurisdictions, continuous emissions monitoring (CEM) data, and facility supplied emissions data.

Ms. Loomis has prepared PM-10 and ammonia emissions inventories in support of particulate modeling and research in the state of California. These inventories were prepared for the San Joaquin Valley modeling region, and have required the synthesis of emissions data from a variety of sources, including the NAPAP emission inventories, NEI, California state inventories of air toxics and criteria pollutants (CEIDARS), and other modeling inventories (SARMAP); and the calculation of emissions from available emissions factors and activity data.

Ms. Loomis has developed emissions modeling inventories for use in SIP planning for a number of projects, including: Pittsburgh-Beaver Valley Ozone Modeling Study, Pennsylvania Stakeholders Ozone Modeling Study, Cincinnati-Hamilton Ozone SIP Modeling Study, Lower Lake Michigan Ozone SIP Modeling Study, Stakeholder Participation in the OTAG/EPA NOx SIP Call Modeling, the South Central Coast Air Basin of California, Ventura County, and Santa Barbara County. These emissions were synthesized from a variety of sources, including emissions inventories developed for OTAG, state and local agency records, and CEM data provide by local utilities.

Ms. Loomis has developed emission inventories to examine the air quality impacts of various alternative motor vehicle fuels and motor vehicle controls strategies, including the Northeast OTC, the Great Lakes region, the Western US, and the South Coast Air Basin in California. These inventories have included the derivation and development of alternate speciation profiles to examine the impacts of reformulated fuels, the development and application of alternate emission factors, and modeling the effects of new and proposed emission control technologies.

### **Technology Transfer Activities**

Ms. Loomis has developed and presented a number of training sessions on emissions modeling systems, including training on CONCEPT, EMS-95 and EPS 2.0. Clients include U.S. EPA, California Air Resources Board, Lake Michigan Air Directors, Missouri DNR, Kansas DNR, private industry, and other consultants. These training sessions include lecture and hands-on application of the selected models, discussion of various approaches and pitfalls common in emissions modeling, discussion of the available modeling alternatives, and selection criteria for appropriate emissions models given project requirements and restrictions.

### **PROFESSIONAL EXPERIENCE**

Air and Waste Management Association (AWMA)

### **Journal Papers And Presentations**

"Processing Mobile Emissions in SMOKE: Is it worth simulating everyday onroad mobile emissions to support 8-hr ozone modeling?," presented at the International Emission Inventory Conference, New Orleans, LA, May 2006. Stella, G.M., C. Loomis, M. Abraczinskas,

"Application Of The Emissions Modeling System EMS-95 To The Southern California SCAQS-97 Domain," Ninth Joint Conference on the Applications of Air Pollution Meteorology, American Meteorological Society and the Air and Waste Management Association, 28 January - 2 February, 1996, Atlanta, (with others).

"Development of a Draft PM-10 Emissions Inventory in the SARMAP region Using EMS-95 Emissions Estimates Modeling System", (with Robert Emigh) 1995 Emissions Inventory: Programs & Progress Specialty Conference, sponsored by AWMA, Research Triangle Park, NC.

"Comparison of the CAL-MoVEM and DTIM2 Emissions Estimate Models", (with James G. Wilkinson) 1995 Emissions Inventory: Programs & Progress Specialty Conference, sponsored by AWMA, Research Triangle Park, NC.

"Evaluation Protocols for Emissions Modeling Systems", (with J.G. Wilkinson) 1993 International Regional Photochemical Measurement and Modeling Studies Specialty Conference, sponsored by AWMA, San Diego, CA.

"An Independent Evaluation of the Geocoded Emissions Modeling and Projections System (GEMAP)", (with J.G. Wilkinson) 1993 International Regional Photochemical Measurement and Modeling Studies Specialty Conference, sponsored by AWMA, San Diego, CA.

"An Electronic Approach to Compliance", (with others) Colorado Hazardous Waste Management Society Fifth Annual Conference, 3-4 October, 1991, Denver, CO.

"Total Data Quality", (with others) Colorado Hazardous Waste Management Society Fifth Annual Conference, 3-4 October, 1991, Denver, CO.

### **Company Reports (selected)**

"Work Plan 2: Emissions Modeling Software Implementation Work Plan. Upgrade of a Regional Air Quality Modelling System (PATH) – Feasibility Study." Prepared for Environmental Protection Department Hong Kong. Prepared by ENVIRON Hong Kong Limited and Alpine Geophysics, June 2009. (with others)

"Second Draft Report— VISTAS Emissions and Air Quality Modeling— Phase I Task 6 Report: Modeling Protocol for the VISTAS Phase II Regional Haze Modeling", prepared for VISTAS, prepared by ENVIRON International Corporation, Novato, CA, Alpine Geophysics, LLC, Ft. Wright, KY, and UC Riverside, Riverside, CA. 2004. (with Stella, G.M., R.W. Morris, B. Koo, T.W. Tesche, C. Loomis, G. Tonnesen, and Z. Wang.)

"Scientific Peer-Review of the Hg-CAMx Atmospheric Mercury Model and Its Application to the 2002 Annual Cycle," prepared for Wisconsin Department of Natural Resources, Mercury Modeling Team, prepared by Alpine Geophysics, LLC, Arvada, CO, April 2004. (with Stella, G.M., T.W. Tesche, D. McNally, J. Wilkinson)

"Technical Support Study 15: Evaluation And Improvement Of Methods For Determining Ammonia Emissions In The San Joaquin Valley." Prepared for the California Air Resources Board, Sacramento, CA. Prepared by Sonoma Technology, Inc., Santa Rosa, CA. STI-95310-1759-DFR. 1997. (with S. Coe, L. Chinkin, J.G. Wilkinson, J. Zwicker, D. Fitz, D. Pankratz, and E. Ringler).

"Comparison of the CAL-MoVEM and DTIM2 Motor Vehicle Emissions Estimate Models", prepared for the California Air Resources Board (Sacramento, CA), February, 1997.

"Photochemical Modeling Analysis of the Pittsburgh-Beaver Valley Ozone Nonattainment Area", (with others) prepared for the Southwestern Pennsylvania Clean Air Stakeholders Group, February 21, 1997.

"Estimates of UAM-IV Model Sensitivities to Emissions Changes in the Pittsburgh-Beaver Valley Ozone Non-Attainment Area", (with others) prepared for the Southwestern Pennsylvania Clean Air Stakeholders Group, September 15, 1996.

"PM10 Air Quality Models for Application in the San Joaquin Valley PM10 SIP", (with others) prepared for the California Air Resources Board (Sacramento, CA), September 1996.

"Pittsburgh Regional Ozone Attainment Study: Emissions Modeling Results", (with James G. Wilkinson) prepared for the Southwestern Pennsylvania Clean Air Stakeholders Group, July 1996.

"Review of Current Methodologies for Estimating Ammonia Emissions", (with others) prepared for the California Air Resources Board (Sacramento, CA), May 1996

"Urban Airshed Modeling for 1996 in the South Central Coast Air Basin of California", (with others), report to Santa Barbara County Air Pollution Control District by Alpine Geophysics, Golden, CO., 1994

"EMS-95: Technical Formulation Document," prepared for the Lake Michigan Air Directors Consortium (Des Plaines, IL) and the Valley Air Pollution Study Agency (Fresno, CA), October 22, 1994 (with James G. Wilkinson).



"Photochemical Modeling in Support of the Ventura County SIP", (with others), Alpine Geophysics, Crested Butte, CO., 1994.

"Software Verification and Validation Plan for the GEMAP System", (with others), Radian Corporation, Sacramento, CA, 1991.

"Software Testing Plan for the GEMAP System", (with others), Radian Corporation, Sacramento, CA, 1991.