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**AN ANNOTATED BIBLIOGRAPHY OF
TRANSPORTATION-RELATED AIR QUALITY DOCUMENTS:
1989-1994**

by

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Research Report 1279-8
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Research Study Title: Air Pollution Implications of Urban
Transportation Investment Decisions

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IMPLEMENTATION STATEMENT

The Clean Air Act Amendments (CAAA) of 1990 have imposed many requirements on the nonattainment areas in the nation. Federal and state agencies have released many regulations and guidance documents that directly affect those responsible for meeting the CAAA requirements. This bibliography contains a list of the documents related to the transportation aspects of the air quality requirements. The bibliography was compiled as a resource for staff in the Texas Department of Transportation, the Texas Natural Resource Conservation Commission, nonattainment areas, and other interested parties.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration or the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation. Additionally, this report is not intended for construction, bidding, or permit purposes. Raymond A. Krammes, P.E., #66413, was the Study Supervisor for the project.

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LIST OF ABBREVIATIONS AND ACRONYMS

ATP	Anti-Tampering Program
BER	Basic Emission Rate
BIOME	Biogenic Source Model (part of GEMAP)
CAAA	Clean Air Act Amendments of 1990
CALIMFAC	California I/M Emission Factor
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CB-IV	Carbon-Bond
CO	Carbon Monoxide
DTIM	Direct Travel Impact Model
E7FWT	Weight Program
EPA	Environmental Protection Agency
EPS	Emissions Preprocessor System
F	Fahrenheit
FIP	Federal Implementation Plan
FTP	Federal Test Procedure
g/hr	grams per hour
GEMAP	Geocoded Emissions Modeling and Projections (larger part of MoVEM)
GIS	geographic information system
HC	hydrocarbon
I/M	Inspection and Maintenance
IRS	Impact Rate Summarization
kph	kilometers per hour
LAP	local area parameter
lbs.	pounds
LMOS	Lake Michigan Ozone Study
MoVEM	Motor Vehicle Emission Model or Motor Vehicle Source Model
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NCTCOG	North Central Texas Council of Governments
NJDOT	New Jersey Department of Transportation
NMHC	Nonmethane hydrocarbon
NO	Nitrogen Monoxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrous Oxides
OMS	Office of Mobile Sources (EPA)
PC	personal computer
PM-10	Particulate Matter (over 10 micrometers in diameter)
PPAQ	Post Processor for Air Quality

ppm	parts per million
RVP	Reid vapor pressure
SAI	Systems Applications International
SARMAP	San Joaquin Valley Air Quality Study/Atmospheric Utilities Signatures, Predictions and Experiments Regional Modeling Adaptation Project (see MoVEM section)
SCC	Source Classification Code
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
UAM	Urban Airshed Model
UTPS	Urban Transportation Planning Study
VHT	vehicle hours of travel
VMT	vehicle miles of travel
VOC	Volatile Organic Compound

SUMMARY

This bibliography represents the collection of transportation-related air quality materials collected by the Texas Transportation Institute in support of research for the Texas Department of Transportation and the Federal Highway Administration. The bibliography is arranged by subject and contains abstracts for most of the citations. Information is also given on where to obtain some of the federal documents listed.

INTRODUCTION

This bibliography was compiled in support of the Texas Transportation Institute's (TTI) air quality research for the Texas Department of Transportation (TxDOT) and the Federal Highway Administration. TTI has been sending lists of documents as they were acquired to interested parties in TxDOT, the Texas Natural Resource Conservation Commission, and the four Texas nonattainment areas.

This is not a comprehensive bibliography of all air quality materials that were published between 1989 and 1994. Rather, it represents the collection that TTI has collected on air quality aspects of transportation. The collection consists mainly of government documents, reports, papers, books, *Federal Register* and *Texas Register* notices, and articles. Most, but not all, of the references have an abstract included with the citation.

This bibliography is divided into two sections: (1) a subject bibliography and (2) an annotated bibliography. The subject bibliography has the collection listed by subject, without annotations, because some citations may be listed under several subject headings and an effort to conserve space was made by listing the abstracts only once in the annotated bibliography. Each citation in the subject listing has a record number in parentheses at the beginning of the cite. These record numbers will match the record numbers listed with the annotated citations. The annotated bibliography follows the subject bibliography and is listed in record number order. Items of interest found in the subject bibliography can be quickly found in the annotated bibliography by looking for the citation's record number. An author index is included at the end of this document. In addition, a list of acronyms is included in the front matter.

Many of the documents listed can be obtained from the U.S. Environmental Protection Agency (EPA). General air quality documents published by the EPA can usually be obtained by requesting a copy from their research library in Research Triangle Park, North Carolina, at (919) 541-2777. EPA documents more specific to mobile source emissions can be requested from their library in Ann Arbor, Michigan, at (313) 668-4311. For persons who have access to a computer modem and software, the easiest way to get EPA documents is by downloading them from the EPA's bulletin board system at (919) 541-5742. The bulletin board supports 14,400 bits per second and slower connections. Software settings should be set to N-8-1 (no parity, 8 data bits, 1 stop bit). The bulletin board system has a gateway feature that connects the user to a variety of EPA bulletin boards. For example, the CAAA bulletin board has the full text of the Clean Air Act Amendments as well as summaries for each title of the act. The OMS bulletin board has files, regulations, and software specific to mobile source emissions. Other government agency documents can usually be obtained by contacting their respective libraries or technology transfer offices.

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- (147) Barbour, Wiley. "VMT Spreadsheet Converter." Memorandum, April 8, 1994.
- (172) Brzezinski, David J. "Effect of VMT Growth on MOBILE5 NO_x Estimates." Memorandum, April 5, 1994.
- (184) Cambridge Systematics, Inc. *A Study of Highway Vehicle Emission Inventory Procedures for Selected Urban Areas*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, January 1993. Report number: EPA/452/R-93/011; NTIS no. PB93-185577/WTS (\$19).
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- (660) U.S. Environmental Protection Agency. "Approval and Promulgation of Implementation Plan Texas Stage II Program (Final Rule)." 59 FR 17940, April 15, 1994.

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- (103) *1994 Transportation Improvement Program for the Gulf Coast State Planning Region*. Houston, Tex.: Houston-Galveston Area Council, July 1993.

- (104) *1st Quarter UAM Status*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, February 2, 1994.

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- (110) *The Adoption of the California Low Emission Vehicle Standards in Texas: Summary Report*. Austin, Tex.: Texas Air Control Board, August 1993.

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- (114) *Air Pollution: EPA Not Adequately Ensuring Vehicles Comply with Emission Standards*. Washington, D.C.: U.S. General Accounting Office, July 1990. Report number: GAO/RCED-90-128.

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- (116) *Air Pollution: EPA's Progress in Determining the Costs and Benefits of Clean Air Legislation.* Washington, D.C.: U.S. General Accounting Office, February 1994. Report number: GAO/RCED-94-20.
- (117) *Air Pollution: EPA's Strategy and Resources May Be Inadequate to Control Air Toxics.* Washington, D.C.: U.S. General Accounting Office, June 1991. Report number: GAO/RCED-91-143.
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- (119) *Air Pollution: Global Pollution from Jet Aircraft Could Increase in the Future.* Washington, D.C.: U.S. General Accounting Office, January 1992. Report number: GAO/RCED-92-72.
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- (121) *Air Pollution: Oxygenated Fuels Help Reduce Carbon Monoxide.* Washington, D.C.: U.S. General Accounting Office, August 1991. Report number: GAO/RCED-91-176.
- (122) *Air Pollution: Regional Approaches Are Needed to Protect Visibility in National Parks and Wilderness Areas.* Washington, D.C.: U.S. General Accounting Office, April 29, 1994. Report number: GAO/T-RCED-94-102.
- (123) *Air Pollution: Reliability of EPA's Mobile Source Model Could Be Improved.* Washington, D.C.: U.S. General Accounting Office, May 1990. Report number: GAO/RCED-90-138.
- (124) *Air Pollution: State Planning Requirements Will Continue to Challenge EPA and the States.* Washington, D.C.: U.S. General Accounting Office, June 1993. Report number: GAO/RCED-93-113.
- (126) *Air Pollution: Unresolved Issues May Hamper Success of EPA's Proposed Emissions Program.* Washington, D.C.: U.S. General Accounting Office, September 1992. Report number: GAO/RCED-92-288.

- (127) *The Air Pollution-Transportation Linkage: How Vehicle Travel on Our Roads and Highways Affects the Air We Breathe*. Sacramento, Calif.: Office of Strategic Planning, California Air Resources Board, 1989.
- (128) *Air Quality Atlas*. Research Triangle Park, N.C.: Office of Air Quality, U.S. Environmental Protection Agency, May 1992. Report number: 400-K-92-002.
Small booklet that contains some text and has color maps of the nation indicating where nonattainment areas are for each of the six criteria pollutants. Also includes maps of monitoring network locations, temperature highs, and population.
- (129) *Air Quality Conformity Analysis of Mobility 2010: The Regional Transportation Plan for North Central Texas, Interim Period, Phase I*. Dallas, Tex.: Transportation Department, North Central Texas Council of Governments, September 1991.
The Regional Transportation Plan for North Central Texas was developed to provide conformity to the applicable SIP and ensure consistency between federal actions and the air quality planning process for the nonattainment area for ozone in the Dallas - Fort Worth area.
- (131) *Air Quality Modeling Results for Reformulated Gasolines in Year 2005/2010*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, May 1991. Report number: Technical Bulletin No. 3.
- (132) *Air Quality Programs and Provisions of the Intermodal Surface Transportation Efficiency Act of 1991: A Summary*. Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation, 1992. Report number: FHWA-PD-92-022; HEP-41/8-92(40M)E.
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- (137) Apogee Research, Inc. *Costs and Effectiveness of Transportation Control Measures (TCMs): A Review and Analysis of the Literature*. Washington, D.C.:

National Association of Regional Councils, January 1994.

- (138) "Appendix M - Statutory Language: CAA Excerpts - Transportation Provisions." Washington, D.C.: American Association of State Highway and Transportation Officials, 1992.

Appendix M accompanies the "User-Friendly Guide to the Transportation Provisions of the 1990 CAA." Appendix M provides excerpts from the CAA for every transportation related provision described and explained in the Guide.

- (140) *Assessment of Computer Models for Estimating Vehicle Emission Factors, Volume I: Executive Summary (Final Report)*. San Rafael, Calif.: Systems Applications International, July 19, 1991. Report number: SYSAPP-91/091a.

This report provides a summary of the comparison of MOBILE4 and EMFAC7E. Highlights of major findings and conclusions regarding fleet characterization, calculation of exhaust and evaporative emission rates, and correction factors for operating mode, speed, temperature, and fuel volatility in the two models are included.

- (141) *Assessment of Computer Models for Estimating Vehicle Emission Factors, Volume II: Description and Comparison of the MOBILE4 and EMFAC7E Models (Final Report)*. San Rafael, Calif.: Systems Applications International, July 19, 1990. Report number: SYSAPP-91/091b.

Due to discrepancies between measured emission rates and MOBILE4 and EMFAC7 measured emission rates, this report assesses the methodologies used in MOBILE4 and EMFAC7 to estimate hydrocarbon, carbon monoxide and nitrogen oxides emission factors. Specifically, this report studies the structure and operation of the MOBILE4 and EMFAC7 computer models and analyzes the sensitivity of these models to determine factors that highly influence emission rates.

- (142) *Assessment of Computer Models for Estimating Vehicle Emission Factors, Volume III: Sensitivity Analysis of the MOBILE4 and EMFAC7E Emission Models (Final Report)*. San Rafael, Calif.: Systems Applications International, July 19, 1991. Report number: SYSAPP-91/091c.

Volume II compared EMFAC7E and MOBILE4 emission models and identified key parameters and model assumptions essential in model formulation. Through sensitivity analysis, this report identifies those parameters and assumptions that have a strong influence on emission rates and those that do not. Observed changes in the emission rates are compared with expected changes in the emission rates and the discrepancies between the two are then used to evaluate each model.

- (143) Austin, B. S., J. G. Heiken, S. B. Shepard and L. L. Duvall. *Methodologies for Estimating Emission and Travel Activity Effects of TCMs (Draft Final Report)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, July 27, 1992. Report number: SYSAPP-92/096.
- (144) *Auto Emissions and Congestion Charging: Addressing California's Infrastructure & Air Pollution Crises*. Santa Monica, Calif.: Reason Foundation, April 1990.
Transcript of a Reason Foundation/Competitive Enterprise Institute Seminar held April 17, 1990 at the Hyatt Hotel, Los Angeles International Airport.
- (145) *Automotive Fuel Economy Program - Eighteenth Annual Report to the Congress*. Washington, D.C.: National Highway Traffic Safety Administration, U.S. Department of Transportation, January 1994.
This report sums up the 1993 activities of the National Highway Traffic Safety Administration (NHTSA) regarding implementing Sections of Title V: "Improving Automotive Fuel Efficiency," of the Motor Vehicle Information and Cost Savings Act of 1972. Also, this report highlights 1993 rulemaking activities (NHTSA) and the use of advanced automotive technology by the industry as required by Section 305, Title III, of the Department of Energy Act of 1978.
- (146) Balogh, Morgan, Timothy Larson and Fred Mannering. "Analysis of Fine Particulate Matter Near Urban Roadways." *Transportation Research Record*, 1416 (October 1993): 25-32.
This article reports findings of a study on the emissions and dispersions of particulate matter near urban roadways. Particulate matter of less than 2.5 micrometers (PM-2.5) was studied. Results of the study showed that urban buses are the major source of particulate emissions. It also showed that buses with low exhaust pipes generate higher concentrations of roadside fine particulate matter than buses with elevated exhausts. "The findings suggest that the EPA's AP-42 procedure for calculating resuspended particulate matter near urban roads is grossly inaccurate, producing values that are 9 to 20 times higher than observed fine particulate levels."
- (147) Barbour, Wiley. "VMT Spreadsheet Converter." Memorandum, April 8, 1994.
Short memo announcing that the user's guide for the VMT converter software for uploading on-road data to AIRS-AMS has been revised.
- (148) Barbour, Wiley J., Garry W. Brooks, Joe M. Mangino, Mark A. Wolcott, Terry Newell and Natalie M. Dobie. *Quality Review Guidelines for 1990 Base Year Emission Inventories*. Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, August 1992. Report number: EPA 454/4-92-007.

The primary purpose of this document is to provide a standard set of guidelines to use in conducting formal reviews of 1990 base year SIP inventories received from ozone and CO nonattainment areas. This document provides review guidelines that address whether States followed the overall requirements for base year inventory preparation published in previous guidance material and whether the inventories meet developed specifications for completeness, consistency (both internal and with national trends), reasonableness of emission values, and overall documentation requirements. This document was originally published in September 1991 as EPA Report Number EPA-450/4-91-022. It has been revised to include expanded questions for on-road mobile sources for both the MOBILE4.1 model and vehicle miles travelled (VMT). In addition, a new checklist covering off-road mobile sources has been added.

- (149) Barnard, William R., Charles C. Monroe, T. Allan Dean and E. Sue Kimbrough. "Development of a Prototype System for Tracking Reasonable Further Progress Under the Clean Air Act Amendments." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 310-320. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (150) Barnard, William, Patricia Carlson, Gerhard Gschwandtner and Laurel Schultz. "Emission Trends of the Criteria Pollutants in the United States." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 697-706. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- Mostly reproduced overheads that show emission trends, broken down into transportation, stationary, and other sources, up to 1991. Final results will be published in EPA's *National Air Pollutant Emission Estimates, 1900-1991*.
- (151) *Basics to Using MOBILE5.0a*. Videorecording of a presentation by David Brzezinski, n.p., August 24, 1993.
- A video of a presentation by David Brzezinski on how to use MOBILE5.0a.
- (153) Baugues, Keith. "Application of Receptor Modeling for VOC Emissions." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 91-101. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (154) Beckham, Bradley, William Reilly and William Becker. "Clean Air Act Amendments and Highway Programs: Perspectives of State and Local Air Administrators." *TR News* (May 1990): 17-21.

- (155) Begley, Sharon and Mary Hager. "Cold Cash for Old Clunkers." *Newsweek* 119 (April 6, 1992): 61.
- (156) Bell, Charles E., Jimmie D. Benson and George B. Dresser. *User's Guide for the Texas Mobile Source Emission Estimation Software: PREPIN, POLFAC5A, COADJ, IMPSUM, and SUMALL*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, October 1993. Report number: Research Report No. 1279-2; FHWA/TX-92/1279-2.
- This research report represents the latest revisions to the software, PREPIN, POLFAC5A, COADJ, IMPSUM, and SUMALL. The report is presented as a user's guide; operating instructions are provided for each program. The mainframe programs were developed to estimate mobile source emissions and vehicle miles traveled (VMT). The PREPIN program allows the analyst to factor a 24-hour assignment to estimate the VMT and speeds for a subject time period. The POLFAC5A program is used to apply MOBILE5A to obtain emission factors. COADJ, a special utility program, combines emission factors from three applications of the POLFAC5A program to produce a new set of emission factors. IMPSUM facilitates the computation of emissions by using the emission factors from POLFAC5A and COADJ. Lastly, SUMALL sums the emission results from two or more time periods plus diurnals. IMPSUM and SUMALL have the additional capability of producing gridded emission estimates.
- (158) Benson, Jim D., James A. Mullins, III and Robert W. Stokes. *Implementation of a Mezzo-Level HOV Carpool Model for Texas*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, November 1989. Report number: Research Report 1103-2F; FHWA/TX-90/1103-2F.
- (159) Benson, Paul E. "Corrections to Hot and Cold Start Vehicle Fractions for Microscale Air Quality Modeling." *Transportation Research Record*, 1176 (1988): 87-92.
- (161) Berry, D. Kent. "Rate-of-Progress Plan Guidance for Ozone Nonattainment Areas." Memorandum to EPA regional offices, 1993.
Cover memo to guidance document.
- (162) Blackard, Andy, Joel Batiste and Anne Pope. "Air Chief CD-ROM, EPA's Newest Emission Estimation Tool." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 604-605. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (164) Breedlove, Buzz. *Motor-Vehicle Inspection and Maintenance in California*. Sacramento, Calif.: California Research Library, August 24, 1993. Report number: CRB-IS-93-007.

Under federal mandate, California's urban areas with serious air pollution problems must switch from the current decentralized "Smog Check" inspection and maintenance program to a centralized, enhanced I/M program. An I/M Review Committee of state air pollution control officials generally agreed with the national mandate. Critics contend that a centralized I/M program may be less effective, more expensive, and more troublesome to California's citizens. This report summarizes the issues involved in the debate over centralized versus decentralized I/M programs in California.

- (165) Bresnock, Anne, Mark A. Miller, Edward H. Lechner and Steven E. Shladover. "Roadway Electrification: Regional Impacts Assessment." *Transportation Research Record*, 1416 (October 1993): 43-52.

Roadway electrification has been proposed to address urban air pollution. The impacts on fossil fuel use and the electric utility industry are investigated, and the regional economic effects of this technology are assessed.

- (166) Brodtman, Karl J. and Thomas A. Fuca. *Determination of Hot and Cold Start Percentages in New Jersey (Final Report)*. Trenton, N.J.: New Jersey Department of Transportation, July 1984. Report number: FHWA/NJ-84/001.

A study was performed in New Jersey where data was collected at field sites to determine the percentages of hot, cold, and stabilized engines. Researchers found that during peak hours, hot starts ranged from 3 to 10.6 percent and cold starts ranged from 36.9 to 64 percent for all roadway classifications. For off-peak hours, hot starts ranged from 8.6 to 30.8 percent and cold starts ranged from 23.2 to 34.2 percent for all roadway classifications.

- (168) Bruckman, Leonard and Edmund L. Dickson. "Preparation of Transportation Data for Use in Emissions Modeling." Paper presented at the 72nd Annual Meeting of the Transportation Research Board, Washington, D.C., January 10, 1993.

- (170) Bruckman, Leonard, Edmund L. Dickson and Paula K. Brooks. "Description of a New Motor Vehicle Emissions Model (MOVEM)." Paper presented at the Emission Inventory Issues in the 1990s USEPA/Air and Waste Management Association Specialty Conference, Durham, N.C., September 10, 1991.

This paper discusses the most widely used motor vehicle emissions estimates software (IMPACT, DTIM, and EPS) and their shortcomings (FORTRAN based, inflexible, and difficult to use). It then goes on to discuss the Lake Michigan Ozone Study (LMOS) Emissions Modeling System (EMS) and how it has individual point, area, biogenic, and motor vehicle source emission estimation models. Due to its modular setup, the motor vehicle emissions model (MOVEM) can be easily separated from the LMOS EMS and applied to other areas outside the Lake Michigan area. The authors discuss the objective and attributes of MOVEM. The paper concludes with a design of MOVEM which

includes the model's algorithms and assumptions used in emissions calculations.

- (172) Brzezinski, David J. "Effect of VMT Growth on MOBILE5 NOx Estimates." Memorandum, April 5, 1994.

- (173) *BURDEN7C: Methodology For Estimating Emissions From On-Road Motor Vehicles*. Sacramento, Calif.: Technical Support Division, Emission Inventory Branch, On-Road Motor Vehicle Section, California Air Resources Board, January 1992.

This report describes BURDEN7C's (a computer program used for estimating emissions of on-road motor vehicles) interaction with the ARB's other motor vehicle emission inventory models, development of activity data for BURDEN7C, and BURDEN7C's basic emissions estimation calculations.

- (174) Cadle, Steven H., Robert A. Gorse and Douglas R. Lawson. "Real-World Vehicle Emissions: A Summary of the Third Annual CRC-APRAC On-Road Vehicle Emissions Workshop." *Air & Waste* 43, 8 (August 1993): 1084-1090.

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- (176) Calcagni, John. "State Implementation Plan (SIP) Actions Submitted in Response to Clean Air Act (Act) Deadlines." Memorandum to EPA regional offices, 1992.

This memorandum's purpose is to clarify issues related to redesignation requests and SIP actions due by November 15, 1992.

- (177) Calcagni, John. "Procedures for Processing Requests to Redesignate Areas to Attainment." Memorandum to EPA Regional Offices, September 4, 1992.

This memo provides guidance to regional offices on handling redesignation requests and drafting *Federal Register* notices.

- (178) Calcagni, John and William G. Laxton. "Public Hearing Requirements for 1990 Base-Year Emissions Inventories for Ozone and Carbon Monoxide Nonattainment Areas." Memorandum to Director, Air, Pesticides and Toxics Management Division, Regions I and IV; Director, Air and Waste Management Division, Region II; Director, Air, Radiation, and Toxics Division, Region III; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics Division, Region VI; Director, Air and Toxics Division, Region VII, VIII, IX, and X, September 29, 1991.

- (179) *California Clean Air Act Transportation Requirements Guidance*. Sacramento, Calif.: State of California Air Resources Board, February 1990.

This report provides guidelines from the Air Resources Board regarding the California Clean Air Act and provides assistance in preparing plans that meet these requirements. Each chapter in this report focuses on specific requirements as followed: reasonably available transportation control measures, indirect source control programs, performance standards and emission reduction targets, control measure definition and analysis, monitoring and report mechanisms, integration of transportation and air quality plans, and public education and public involvement.

- (181) Calland, Dean A. "Title I of the Clean Air Act Amendments of 1990." *Air & Waste* 43 (March 1993): 289-290.

This article discusses the historical background of the Clean Air Act's efforts to achieve attainment with the national ambient air standards beginning with the Air Pollution Control Act of 1955 through the Clean Air Act Amendments of 1970 up to the Clean Air Act Amendments of 1990. It then discusses Title I of the Clean Air Act revised by the 1990 amendments looking specifically at ozone, carbon monoxide, and PM-10.

- (184) Cambridge Systematics, Inc. *A Study of Highway Vehicle Emission Inventory Procedures for Selected Urban Areas*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, January 1993. Report number: EPA/452/R-93/011; NTIS no. PB93-185577/WTS (\$19).

This report identifies potential areas where additional information could be developed that would assist states and urban areas in the preparation of mobile source emissions inventories. It includes a review of current mobile source emissions inventory practices in fifteen urban areas (including Houston). Existing guidance-related materials were assessed in light of the results of the review, and recommendations for improved emissions inventory information or procedures were developed. The report describes the findings from the review of existing mobile source inventory practices. The problems and solutions uncovered from the state and local areas' investigations provide a base of comparison for assessing both current and proposed EPA mobile source inventory preparation procedures.

- (185) Cameron, Michael. "Transportation Efficiency: Tackling Southern California's Air Pollution and Congestion." Oakland, Calif.: Environmental Defense Fund, March 1991.

This report discusses the need for increasing the efficiency of Southern California's underutilized transportation resources through lowering total vehicular travel and raising average vehicle occupancy concurrent with decreased congestion and mobile source emission. To increase efficiency, this report advocates that the price of auto use must be brought into line with the true costs of highway travel. This report recommends the following transportation pricing policies: peak-period pricing on congested corridors, buying out

employer-subsidized parking, annual smog fees based on mileage and emissions performance, and deregulated private transit.

- (186) "Carbon Monoxide Transportation Project Protocol." Los Angeles, Calif.: Southern California Association of Governments, December 1992.
The Southern California Association of Governments (SCAG) negotiated an agreement with the EPA to create a protocol for guiding transportation project sponsors in their preparation of CO analysis.
- (187) Causley, Marion C. "User's Guide for the Urban Airshed Model, Volume IV: User's Manual for the Emissions Preprocessor System." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, June 1990. Report number: EPA-450/4-90-007D.
This report is a user's manual for the Emissions Preprocessing System (EPS). A revised version of this manual was published in June 1992, NTIS number PB93-122380.
- (189) Chapin, Claire E. "Mobile Source CO Modeling: How Good is It?" For presentation at the 86th Annual Meeting & Exhibition, June 13, 1993.
This paper examines the errors in model input (traffic demand forecasting; mobile source emissions estimates) and the resulting consequences in model output of CO concentrations. The author shows that there are large discrepancies in model inputs which can affect output results. These model discrepancies need to be recognized when applying regulatory criteria to projects that have air quality impact and must meet air quality standards in order to be approved.
- (190) "Chapter 2 (MOBILE5 Revision) of the User's Guide to MOBILE4.1 (Mobile Source Emission Factor Model)." Ann Arbor, Mich.: U.S. Environmental Protection Agency, December 4, 1992.
Updated chapter, referencing the input data for MOBILE5. See the MOBILE4.1 user's guide for the entire document. See also the updated Chapter 2 for MOBILE5a.
- (191) "Chapter 2 (MOBILE5a Revision) of the User's Guide to MOBILE4.1 (Mobile Source Emission Factor Model)." Ann Arbor, Mich.: U.S. Environmental Protection Agency, March 1993.
Updated chapter, referencing the input data for MOBILE5a. See the MOBILE4.1 user's guide for the entire document. See also the updated Chapter 2 for MOBILE5.
EPA has also been issuing information sheets on MOBILE5 that deal with a particular issue, such as I/M credits. These are also available from the EPA bulletin board, or through a subscription service from the EPA's Office of Mobile Sources.

- (193) Chernoff, H. and D. Friedman. *Identification and Analysis of Factors Affecting the Adoption of Alternative Transportation Fuels, Final Report, July 1990-December 1991*. McLean, Va.: Science Applications International Corp., 1991. Report number: GRI-92/0064; NTIS PB92-164326 (\$19.00).
- (195) Childress, J. Philip, James H. Wilson, Jr., Carl T. Ripberger and Ronald L. Bradow. "Motor Vehicle Modeling Using Modal Data." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 262-268. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (196) Christiansen, Dennis L. "High-Occupancy Vehicle System Development in the United States (A White Paper)." College Station, Tex.: Texas Transportation Institute, Texas A&M University System, December 1990.
- (197) Christiansen, Dennis L. and Daniel E. Morris. *An Evaluation of the Houston High-Occupancy Vehicle Lane System*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, June 1991. Report number: Research Report 1146-4; FHWA/TX-89/3-1146-4.
- (198) Christopher, Richard A. "Authority of State Departments of Transportation to Mitigate the Environmental Impact of Transportation Projects." Washington, D.C.: Legal Research Digest, Transportation Research Board, May 1992. Report number: NCHRP Project 20-6.
This paper provides a brief historical summary to show how project mitigation policy has evolved and is specifically concerned with current Federal and State statutory mitigation programs.
- (200) "Clean Air Act Amendments of 1990: Detailed Summary of Titles." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 30, 1990.
- (202) "The Clean Air Act Amendments of 1990: Summary Materials." Research Triangle Park, N.C.: Office of Air and Radiation, U.S. Environmental Protection Agency, November 15, 1990.
This report provides an overview of the CAAA, one-page summaries of key titles, a glossary of terms, and legislative chronology.
- (203) "Clean Air Act Creates Many Questions Among Transportation Planners; NARC Comes to the Rescue." *The Urban Transportation Monitor* (April 26, 1991): 2.
The National Association of Regional Councils (NARC) was given a 3 year contract, jointly funded by the EPA and the U.S. DOT, for "Improving the Integration of Transportation and Air Quality."

- (204) "The Clean Air Act of 1990: A Primer on Consensus Building." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, March 17, 1993.

This guide assists individuals and groups of all kinds in developing collaborative techniques to implement the CAAA.

- (206) *Clean Air Through Transportation: Challenges in Meeting National Air Quality Standards*. Washington, D.C.: U.S. Department of Transportation; U.S. Environmental Protection Agency, August 1993.

The Clean Air Act, Sec. 108(f)(3) requires DOT and EPA to submit a report to Congress every three years assessing how well federal, state, and local air quality transportation programs are achieving CAA goals.

This is the first such report, and it covers the period from November 1990 through October 1992. The report states that it is too early to determine if the legislated funding/approach will achieve CAA goals, but that future reports will be more comprehensive.

- (208) Commuter Transportation Services, Inc. *The Employee Transportation Coordinator Handbook*. Washington, D.C.: U.S. Department of Transportation, August 1990. Report number: DOT-T-90-21.

- (211) Conroy, Patrick J. "Transportation's Technology Future: Prospects for Energy and Air Quality Benefits." *TR News* (May 1990): 32-37.

- (213) *Cost-Effectiveness Analysis of CARB's Proposed Phase 2 Gasoline Regulations*. Sacramento, Calif.: Sierra Research, Inc., November 18, 1991.

- (214) Cottrell, Wayne D. "Comparison of Vehicular Emissions in Free-Flow and Congestion Using MOBILE4 and HPMS." Paper prepared for publication by the Transportation Research Board, March 1992.

This paper quantifies and compares vehicular mobile source emissions in free-flow and congested traffic conditions.

- (216) Crawford, Jason A. and Raymond A. Krammes. *A Critical Analysis of Sketch-Planning Tools for Evaluating the Emission Benefits of Transportation Control Measures*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, December 1993. Report number: FHWA/TX-92/1279-5; Research Report 1279-5.

The role of transportation control measures (TCMs) in the transportation planning process has increased since the passage of the 1990 Clean Air Act Amendments. TCM analysis began in the early 1980s, and several sketch-planning tools are now available.

The two premier sketch-planning tools used for evaluating TCMs are the Systems Applications International (SAI) method and the San Diego Association

of Governments (SANDAG) method. Both methods were adapted to an available spreadsheet for easy use and modification. The SAI method required full programming in the spreadsheet, whereas the SANDAG method, originally developed for spreadsheet use, required only minor revisions.

A critical analysis, base scenario comparison, and sensitivity analysis were performed on the SAI and SANDAG methods. Results of the sensitivity analysis showed that the tools are most sensitive to the scope descriptors and work-related variables.

The report concludes that (1) recent work in the field has greatly advanced the state-of-the-practice; (2) the SAI method proved to be a better analysis tool than the SANDAG method; and (3) although sketch-planning tools are gross estimating techniques, they are currently the best TCM analysis tools.

- (217) Creekmore, Ted. *Mobile Input Data Analysis System (MIDAS) User's Guide*. Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, April 1993.

MIDAS is a PC-based data processing system designed to interact with MOBILE4.1 and MOBILE5 users to facilitate the storage, retrieval, and analysis of input variables used in mobile source modeling for SIP emission inventories. This report provides a guide on installing and running MIDAS, generating reports, and evaluating input variables.

- (218) "Criteria for Assessing the Role of Transported Ozone/Precursors in Ozone Nonattainment Areas." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, Technical Support Division, U.S. Environmental Protection Agency, May 1991.

The purpose of this report is to discuss criteria for assessing the effect of transported ozone (O₃) and its precursors on O₃ concentrations observed in locations not attaining the NAAQS for O₃. This assessment should lead to the design of control strategies that are most responsive to environmental conditions prevailing in a nonattainment area. This report also discusses the importance of characterizing transport, describes the appropriate sequence of modeling analysis for considering transport in the design of control strategies, monitoring recommendations (criteria) for estimating transported ozone and precursors needed in the modeling analysis, and summarizes modeling and monitoring criteria for determining contributions of transport in downwind nonattainment areas.

- (219) Curran, T., R. Faoro, T. Fitz-Simons, N. Frank, W. Freas, B. Beard, W. Frietsche, M. Stewart and W. F. Hunt, Jr. *National Air Quality and Emissions Trends Report, 1990*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 1991. Report number: EPA-450/4-91-023.

This report presents national and regional trends in air quality from 1981

through 1990 for the six criteria pollutants. It also presents air quality trends for 15 metropolitan areas. The report contains many charts and maps as well as text.

- (220) Curran, T., R. Faoro, T. Fitz-Simons, W. Freas, J. Hemby, D. Mintz, S. Nizich, B. Parzygnat and M. Wayland. *National Air Quality and Emissions Trends Report, 1993*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, October 1994. Report number: EPA-454/R-94-026.

This report presents national and regional trends in air quality from 1984 through 1993 for the six criteria pollutants. It also presents air quality trends for 89 metropolitan areas. The report contains many charts and maps as well as text.

- (222) Dagang, Deborah A. and William R. Loudon. "Guidelines for the Evaluation of TCM Impacts." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940656.

- (225) Deakin, Harvey, Skabardonis, Inc. *Carbon Monoxide Transportation Project Protocol*. California: Southern California Association of Governments, December 1992.

- (226) DeCorla-Souza, Patrick, Jason Cosby, Jerry Everett and Peter Lim. "A Trip Based Approach to Estimate Emissions with EPA's MOBILE Model." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940376.

- (227) Denver Regional Council of Governments. "Analysis and Evaluation of Transportation Measures to Reduce Vehicular Travel." Denver, Colo.: Denver Regional Council of Governments, October 1991.

- (228) Dickerson, Kenneth R. "At the Gasoline Pump." *EPA Journal* (January 1991).

- (229) Dickson, Edmund L., Paula K. Brooks and Leonard Bruckman. "Producing Gridded, On-Road Motor Vehicle Emissions Estimates Using the MoVEM Model." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 628-650. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (230) Dickson, Edmund L. and Leonard Bruckman. "Conceptual Design of a Motor Vehicle Emissions Model Using Zonal-Based Transportation Model Output - Cal-MoVEM." Presented at the 85th Annual Meeting of the Air & Waste Management Association, Kansas City, Mo., June 21, 1992.

CAL-MoVEM was developed by Radian Corp. to be used with California's EMFAC emission factor model in estimating gridded mobile source emissions for the San Joaquin Valley Air Quality Study. The MOBILE version is

called MoVEM.

- (233) Dolce, Gary. "Reasonable Further Progress Requirements of the CAA Amendments of 1990." Memorandum to Phil Lorang, Chief, Technical Support Staff, January 18, 1991.

This memo provides a description of methods used to make approximate calculations of the effect of reasonable further progress requirements in the 1990 CAAA.

- (236) *Draft User's Guide to PART5: A Program for Calculating Particle Emissions from Motor Vehicles*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, July 1994. Report number: EPA-AA-AQAB-94-2.

PART5 is a Fortran program that calculates particle emission factors in grams/mile from on-road vehicles for particle sizes up to 10 micrograms. It calculates emission factors for the following kinds of particulate matter: exhaust particulate, exhaust particulate components, brakewear, tirewear, and reentrained dust. The model is appropriate for comparative analysis.

- (237) Dresser, George B. and Amy Stephenson. "Air Quality Impacts of HOV Facilities." Presented to the TRB HOV Systems Committee Mid-Year Meeting, Arlington, Tex., June 10, 1993.

- (238) Dresser, George B., Amy Stephenson and William E. Knowles. "Methodologies for Estimating Mobile Source Emission Reductions from HOV Facilities." n.p., December 1993.

This paper summarizes several methods for estimating emission reductions from Transportation Control Measures, particularly High Occupancy Vehicle lanes.

- (240) Duvall, Lori L. and Marianne C. Causley. *TRFCONV User's Guide*. San Rafael, Calif.: Systems Applications International, June 19, 1992. Report number: SYSAPP-92/076.

- (241) E. H. Pechan & Associates, Inc. *Adopting the California Low Emission Vehicle Program in Texas: An Evaluation*. Austin, Tex.: Texas Air Control Board, February 1993. Report number: Pechan Report No. 92.09.012/259 (revised).

- (242) E. H. Pechan and Associates, Inc. *National Air Pollutant Emission Estimates, 1900-1991*. Research Triangle Park, N. C.: U.S. Environmental Protection Agency, October 1992. Report number: EPA-454/R-92-013.

Emission estimates are presented for NO_x, SO_x, and VOC from 1900-1991, for CO and total particulate from 1940-1991, for lead from 1970-1991, and for PM-10 from 1985-1991.

- (243) Eash, Ronald. "Equilibrium Traffic Assignment with High Occupancy Vehicle Lanes." Paper presented at the 72nd Annual Meeting of the Transportation Research Board, Washington, D.C., January 10, 1993.
- (244) *The Economics of Methanol*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, January 1992. Report number: Economics Bulletin No. 1.
- (245) Effa, Robert C. and Lawrence C. Larsen. "Development of Real-World Driving Cycles for Estimating Facility-Specific Emissions from Light-Duty Vehicles." Prepared for the Air and Waste Management Association Specialty Conference on the Emission Inventory--Perception and Reality, October 18-20, 1993, Pasadena, Calif., September 1993.
"Speed-related emission factors based on the Federal Test Procedure driving cycle and other 'speed correction' cycles may be inaccurate, and may not adequately represent contemporary, real-world driving." The authors used real-world data gathered in the Los Angeles area to develop ten cycles representing different average speeds.
- (247) *Effects of Fuel Sulfur Levels on Mass Exhaust Emissions*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, February 1991. Report number: Technical Bulletin No. 2.
- (248) Eggleston, H. S. "United Kingdom Road Traffic Emissions of Atmospheric Pollutants." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 609-627. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (249) Eisinger, Douglas S., Elizabeth A. Deakin, Lenna A. Mahoney, Ralph E. Morris and Robert G. Ireson. "Transportation Control Measures: State Implementation Plan Guidance (Revised Final Report)." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, September 1990. Report number: SYSAPP-90/084.
This guidance document has been developed for the EPA to summarize current knowledge about transportation control measures (TCMs). The target audience includes transportation and air quality management staff at all government levels. The guidance development effort is motivated by the need to provide post 1987 guidance to attain National Ambient Air Quality Standards (NAAQS); however, it is also timely to summarize TCM experiences of the past 10 to 15 years.
- (251) *Emission Inventory Requirements for Carbon Monoxide State Implementation Plans*. Research Triangle Park, N.C.: Emissions Inventory Branch, Technical Support Division, Office of Air Quality Planning and Standards, U.S.

Environmental Protection Agency, March 1991. Report number: EPA 450/4-91-011.

This document describes the emission inventory requirements related to preparation and submission of carbon monoxide State Implementation Plans (SIPs) for those States required to revise their plans after November 15, 1990. Discussed in the document are emission inventory requirements relating to geographic area of coverage, point source cutoff size specifications, sources to be included, data reporting formats, documentation requirements, quality of data base, years to be addressed, and schedule for inventory submission.

(252) *Emission Inventory Requirements for Ozone State Implementation Plans*. Research Triangle Park, N.C.: Emission Inventory Branch, Technical Support Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, March 1991. Report number: EPA 450/4-91-010.

This document describes the emission inventory requirements related to preparation and submission of ozone State Implementation Plans (SIPs) for those States required to revise their plans after November 15, 1990. Addressed in the document are emission inventory requirements relating to graphic area of coverage, point source cutoff size specifications, sources to be included, pollutants of interest, data reporting formats, documentation requirements, quality of data base, years to be addressed, and schedule for inventory submission.

(254) *Emissions and Air Quality Modeling Results from Methanol/Gasoline Blends in Prototype Flexible/Variable Fuel Vehicles*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, January 1992. Report number: Technical Bulletin No. 7.

(255) *Emissions Results of Oxygenated Gasolines and Changes in RVP*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, September 1991. Report number: Technical Bulletin No. 6.

(256) "Energy and Environmental Issues 1991." *Transportation Research Record*, 1312 (1991).

(257) Enns, Phil and James P. Markey. "Characterizing Driving Behavior: Results of EPA's Driving Surveys." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 663-674. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

(259) *Estimated Costs of Modifying Gasoline Properties*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, January 1992. Report number: Economics Bulletin No. 2.

- (260) Euritt, Mark A., Jiefeng Qin, Jaron Meesomboon and C. Michael Walton. "A Framework for Evaluating TCMs: Mobility, Air Quality, and Energy Consumption Tradeoffs." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940718.
- (261) Euritt, Mark A., Dean B. Taylor and Hani S. Mahmassani. "Cost Effectiveness Analysis of TxDOT CNG Fleet Conversion." Washington, D.C.: Transportation Research Board, January 1993. Report number: TRB Paper No. 930936.
- (262) "An Evaluation of 'Remote Sensing' for the Measurement of Vehicle Emissions." Sacramento, Calif.: Sierra Research, Inc., November 18, 1991. Report number: SR90-08-02.
- (263) Eversmann, D. P., T. Wang, J. Pearson, E. Metoyer, S. Sorrow, J. Zhao and M. O. Rodgers. "Repetitive Analysis of In-Use Vehicle Emissions Under Load." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 269-277. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (264) *Example Documentation Report for 1990 Base Year Ozone and Carbon Monoxide State Implementation Plan Emission Inventories*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, March 1992. Report number: EPA-450/4-92-007.
This report is intended to enhance the emission inventory preparation guidance in *Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Volume I; Emission Inventory Requirements for Ozone State Implementation Plans*; and *Emission Inventory Requirements for Carbon Monoxides State Implementation Plans*. This report provides guidance on how to present and document data for an inventory.
- (265) *Exhaust Emissions of Toxic Air Pollutants Using Reformulated Gasolines*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, June 1991. Report number: Technical Bulletin No. 5.
- (267) Federal Highway Administration. "Information: Interim Guidance on the Congestion Mitigation and Air Quality Improvement Program (CMAQ Program)." Memorandum to Regional Federal Highway Administrators and Federal Lands Highway Program Administrator, February 20, 1992.
This memo provides interim guidance for the obligation of CMAQ funds.
- (268) Federal Highway Administration. "Information: Conformity and Nitrogen Oxides (NOx)." Memorandum to FHWA and FTA Regional Offices, March 10, 1994.
Provides information on NOx conformity. Includes background data on

NOx, transportation options to reduce NOx emissions, travel demand modeling considerations on NOx emissions, current NOx-related conformity issues, NOx waivers and other EPA actions affecting NOx conformity, and a list of USDOT contacts for more information on particular aspects of NOx. See also their May 17, 1994 follow-up memo.

- (269) *Federal Test Procedure Review Project: Preliminary Technical Report*. Research Triangle Park, N.C.: Certification Division, Office of Mobile Sources, Office of Air and Radiation, U.S. Environmental Protection Agency, May 1993. Report number: EPA 420-R-93-007.

The principle subject of this report is driving behavior, including acceleration and trip start patterns. After reviewing existing research on driving behavior, the Agency determined that new surveys were needed to assess current driving in U.S. nonattainment regions. A parallel study of current technology vehicle emissions under the full range of driving conditions is also in progress. Results from these studies will be combined in determining the need for test procedure revisions. This preliminary technical report discusses how the driving surveys were conducted, presents analyses of the results, and compares the data to the existing FTP. Quantitative assessments of the emission impacts are still in progress and are not discussed in this report.

- (270) Federal Transit Administration, Office of Technical Assistance and Safety. "Technical Assistance Brief: Clean Air Program." Washington, D.C.: U.S. Department of Transportation, September 1992. Report number: Bulletin Number 4.

This bulletin contains information on alternative fuels and natural gas for buses.

- (271) Federal Transit Associate Administrator for Grants Management and Federal Highway Associate Administrator for Program Development. "Information: Further Guidance on the Congestion Mitigation and Air Quality Improvement Program (CMAQ Program)." Memorandum to Regional Federal Transit Administrators, Regional Federal Highway Administrators, and Federal Lands Highway Program Administrator, October 16, 1992.

This memo provides further guidance for the obligation of CMAQ funds. Information in this memo supersedes the February 20, 1992 interim guidance and incorporates the PM-10 policy memorandum of July 30, 1992. This guidance was coordinated with the EPA.

- (272) FHWA Office of Environment and Planning and FTA Office of Planning. "Information: Conformity and Nitrogen Oxides (NOx)." Memorandum, May 17, 1994.

Provides further information to their March 10, 1994 memo on NOx.

Includes a summary of Ohio's NO_x modeling experiences and a memo from EPA on the effect of VMT growth on MOBILE5 NO_x estimates.

(273) Fieber, Julie, Barbara Austin and Jeremy Heiken. "Characteristics of MOBILE4 and EMFAC7E Models." In *Transportation Planning and Air Quality: Proceedings of the National Conference*, edited by Wayson, Roger L., 255-270. Santa Barbara, Calif., July 28, 1991. New York: American Society of Civil Engineers, 1992.

(274) Fieber, Julie, Heather Trumbower and Robert Ireson. *User's Guide to the PC Version of the Direct Travel Impact Model (Final Version)*. San Rafael, Calif.: Systems Applications International, July 23, 1992. Report number: SYSAPP-92/079.

The PC-based Caltrans version of the Direct Travel Impact Model (PC-DTIM) calculates detailed air pollutant emissions estimates for on-road mobile sources. This report provides guidelines to develop mobile source emission estimates for urban areas successfully by using PC-DTIM.

(275) *Final Regulatory Impact Analysis: Refueling Emission Regulations for Light Duty Vehicles and Trucks and Heavy Duty Vehicles*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, January 1994.

Culminating a rulemaking process which has spanned more than a decade, the EPA is now promulgating final regulations requiring all highway light-duty vehicles, light-duty trucks, and heavy-duty vehicles to meet onboard refueling vapor recovery (ORVR or onboard controls) standards. Accordingly, the purpose of this analysis is to evaluate the costs, benefits, and overall cost effectiveness of onboard control for the reduction of refueling emissions from highway motor vehicles.

(276) Finlayson-Pitts, B. J. and J. N. Pitts, Jr. "Atmospheric Chemistry of Tropospheric Ozone Formation: Scientific and Regulatory Implications." *Air & Waste* 43, 8 (August 1993): 1091-1100.

(280) Fleet, Christopher and Charles Goodman. "Implications of ISTEA and CAAA '90 for Transportation Planning Data Needs." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 76-94. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

(281) "Freeway Operations, Highway Capacity, and Traffic Flow 1991." *Transportation Research Record*, 1320 (1991).

(282) *FTP Test Program Driving Cycles*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, November 9, 1993.

As part of the EPA's FTP revision project, researchers are testing vehicles over a number of new driving cycles. This document provides a very brief description of the five driving cycles developed thus far. Additional files contain cycle times and vehicle speeds for each of the driving cycles.

- (283) "Fuel-Cell Powered Transit Bus Manufactured." *The Urban Transportation Monitor* 7, 12 (June 25, 1993): 1.
- (284) Fuhs, Charles A. *Synthesis of Highway Practice 185: Preferential Lane Treatments for High-Occupancy Vehicles*. Washington, D.C.: National Academy Press, 1993.
- (285) Gabele, Lee. "Emissions Calculation in AIRS/AMS by 'Y1/Y2' - Proposed Modifications to AMS and Management of Emissions Data in the Emissions Preprocessor System for Modeling." Memorandum, April 28, 1993.
This note discusses a proposed modification in the algorithm used to calculate seasonal (period) daily activity rates in the Area and Mobile Subsystem (AMS) of the Aerometric Information Retrieval System (AIRS). The proposed modification would affect the way daily activity rates are calculated for source categories with seasonal throughput less than 25 percent.
- (286) *GEMAP System Documentation (Draft)*. Sacramento, Calif.: Radian Corporation, December 3, 1992.
This draft provides information on system configuration and installation, as well as a user's guide, for the Geocoded Emissions Modeling and Projections (GEMAP) system developed by Radian Corp. for the Lake Michigan Ozone Study. GEMAP is a modular system, containing modules for point and area sources, biogenic sources, and mobile sources (the MoVEM model).
- (287) "General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, April 1992.
The purpose of this report is to provide the public with advance notice of how the EPA intends to interpret various requirements and issues that have arisen under Title I of the CAAA. The information in this report is intended to guide States and to help ensure that they prepare and submit SIP's or SIP revisions that comply with Title I provisions.
- (288) *George Air Force Base, the Proposed Action (Reuse Plan), Phase II: Methodology for Conformity Analysis*. Los Angeles, Calif.: Air Force Center for Environmental Excellence and the Southern California Association of Governments, November 1993.

- (290) "Getting Started on Title I: A Summary of the Provisions in the Clean Air Act Amendments of 1990 for Ozone and Carbon Monoxide Nonattainment Areas." Research Triangle Park, N.C.: Air Quality Management Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, April 1991.

This guideline was developed by the EPA to assist States in preparing their ozone and carbon monoxide (CO) State Implementation Plans (SIP's) as required by Title I. This document focuses on those actions the States must take in the early stages regarding the designation and classification of nonattainment areas, development and adoption of required control measures, and technical analysis of their pollution problems and control strategies.

- (293) Glazer, Amihai, Daniel Klein and Charles Lave. "Clean for a Day: Troubles with California's Smog Check." Berkeley, Calif.: University of California Transportation Center, August 1993. Report number: UCTC No. 163.

The California I/M Review Committee, in its Fourth Report to the Legislature, recommends that the BAR90 test machines be replaced by a new dynamometer test machine, IM240, and the current system of multiple, private testing centers be replaced by a centralized system of state controlled testing centers. This report looks at these recommendations in three ways: the cost to the motorist, the possible use of remote sensing as part of I/M programs, and the effectiveness of different programs for reducing vehicle emissions.

- (294) "Glossary of Terms and Abbreviations." *HOV System Notes*, no. 7 (May 1993).

- (296) Greene, David L. and Anju Rathi. *Alternative Motor Fuel Use Model: Model Theory and Design and User's Guide*. Oak Ridge, Tenn.: Oak Ridge National Laboratory, March 1990. Report number: ORNL/TM--11448; NTIS DE90 012040 (\$26.45).

- (297) Guensler, Randall. "Data Needs for Evolving Motor Vehicle Emission Modeling Approaches." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 167-196. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

- (298) Guensler, Randall and Anne B. Geraghty. "A Transportation/Air Quality Research Agenda for the 1990's." For presentation at the 84th Annual Meeting & Exhibition of the Air & Waste Management Association, Vancouver, British Columbia, June 16, 1991.

This paper looks at a broad range of research areas that are needed to bring a higher certainty to the transportation/air quality planning process.

- (299) Guensler, Randall, Simon Washington and Daniel Sperling. "A Weighted Disaggregate Approach to Modeling Speed Correction Factors." Paper Submitted for Presentation at the 72nd Meeting of the Transportation Research Board, Washington D.C., January 10, 1993.

This paper analyzes an alternate disaggregate speed correction factor model approach all within the guidelines of the California Air Resources Board's speed correction factor model where average speed of emission testing cycle is the single independent variable and four vehicle technology groups are used.

- (300) "Guidance for Emission Reduction Credit Generation by Clean Fuel Fleets and Vehicles." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, January 1993.

This report provides guidelines to States that are interested in allowing credits generated in their clean fuel vehicle fleet program or a similar state-originated program to be used for emission credit trading.

- (301) *Guidance for Growth Factors, Projections, and Control Strategies for the 15 Percent Rate-of-Progress Plans.* Washington, D.C.: Ozone/Carbon Monoxide Programs Branch, U.S. Environmental Protection Agency, March 17, 1993.

The purpose of this addendum is to provide information on the status of issues that have been raised regarding the 15 percent rate-of-progress plans. These issues are divided into three categories: clarification of resolved issues, status of previously identified issues, and identification of new issues.

- (302) "Guidance For Mobile Emission Credit Generation by Urban Buses." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, January 1993.

This report discusses the regulatory programs and current credit exchange programs for urban buses and then develops a credit generation program for new urban buses and bus fleets which exceed emission requirements using clean technologies.

- (303) "Guidance for the Implementation of Accelerated Retirement of Vehicles Program." Research Triangle Park, N.C.: Office of Mobile Sources, U.S. Environmental Protection Agency, February 1993.

This report is to provide guidance to States that are interested in developing criteria and procedures for the implementation and administration of scrappage programs. It examines scrappage programs and specifies a base methodology for the calculation of MERCs from such programs.

- (306) *Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate-of-Progress Plans.* Research Triangle Park, N.C.: Ozone/Carbon Monoxide Programs Branch, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, October 1992. Report

number: EPA 452/R-92-005.

This document focuses on the requirements due November 1992 relative to the rate-of-progress plan, including adjustments that must be made to the base year (1990) emission inventories. This document clarifies guidance provided in an August 7, 1992 memo from Mr. J. David Mobley, Chief, Emissions Inventory Branch, to U.S. EPA Regional Chiefs, regarding "November 15, 1992, Deliverables for RFP and Modeling Emission Inventories."

- (307) *Guidance on the Post-1996 Rate-of-Progress Plan and the Attainment Demonstration (Corrected Version)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, February 18, 1994.

The CAAA requires a SIP revision, due November 15, 1994, which describes how an ozone nonattainment area will achieve post-1996 VOC reductions of at least 3 percent per year averaged over each consecutive 3-year period until the attainment date. The SIP revision must also describe how any growth in emissions over each applicable post-1996 period will be offset. The portion of the SIP revision that describes the above VOC reductions is called the post-1996 rate-of-progress (ROP) plan.

This document focuses on the calculation of post-1996 target levels, the required submittals and submittal schedules for each element of the post-1996 ROP plan and attainment demonstration, and the development of control strategies to achieve the required emission reductions. Also provided is information on acceptable data sources and procedures for projecting emissions.

This document also describes the EPA requirements for an attainment demonstration based on photochemical grid modeling and discusses the role of NO_x reductions in attainment demonstrations. Additionally, this document discusses the general implications of milestone and attainment failures for serious and above ozone nonattainment areas. Specific requirements for milestone compliance demonstrations and consequences of failure to meet a milestone will be addressed in future rulemaking. This document also provides a sample checklist to aid States in a step-by-step review of their ROP plans to ensure that they contain all of the necessary components required for approval by EPA. Finally, this document provides blank forms that States are encouraged to use to document and submit their post-1996 ROP plans.

- (309) *Guidance on Urban Airshed Model (UAM) Reporting Requirements for Attainment Demonstration*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, March 1994.

This document provides guidance to State agencies for documenting modeling procedures and results supporting 1994 revisions to ozone SIPs. The guidance identifies seven broad areas which must be documented in the SIP submittal: (1) a modeling protocol; (2) emission preparation (including quality assurance) procedures and results; (3) air quality and meteorological data input

preparations and results; (4) diagnostic tests performed to improve model performance; (5) model performance results; (6) control measures and air quality simulation results corresponding with the selected "attainment strategy;" and (7) methods for accessing data files used and produced by the model. Areas with overlapping domains must address input data consistency among the domains. Although the SIP is due November 15, 1994, EPA recommends that each of the seven parts be transmitted to the appropriate regional office as soon as it is ready, which will foster a higher quality analysis and review and diminish the need for last minute changes or additions.

- (310) *A Guide to the Congestion Mitigation and Air Quality Improvement Program*. Washington, D.C.: Federal Highway Administration, 1994. Report number: FHWA-PD-94-008; HEP-41/1-94(40M)E.

Brochure describing the CMAQ program and how to get funding. Includes lists of contacts in MPOs, State DOTs, and the U.S. DOT.

- (312) *Guideline for Determining the Applicability of Nitrogen Oxides Requirements Under Section 182(f)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, December 1993.

According to Seitz's cover memo, this document is a subject policy document to be sent to State and local air pollution control agencies. Section 182(f) of the CAA requires the application of reasonably available control technology and new source review for major sources of NO_x in moderate and above ozone nonattainment areas and for the Ozone Transport Region. Section 182(f) also contains provisions for exempting areas from these NO_x requirements. This guideline indicates how EPA expects to handle the exemption provision. This document is available from EPA's bulletin board, file name=noxexemp.zip.

- (313) *Guideline for Modeling Carbon Monoxide From Roadway Intersections*. Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, Technical Support Division, U.S. Environmental Protection Agency, November 1992. Report number: EPA-454/R-92-005.

This guideline provides uniform estimation methods for determining air quality impacts of vehicular traffic at intersections and if such impacts are within the National Ambient Air Quality Standards (NAAQS) for CO. This guideline can assist with intersection analysis in accordance with State Implementation Plans (SIPs) and with Environmental Impact Statements (EISs). This guideline furnishes current techniques for emissions calculations (MOBILE5 Emissions Model) and traffic flow and delay (1985 Highway Capacity Manual (HCM)).

- (319) Hartgen, David T., Walter E. Martin and Andrew J. Reser. "Transportation-Related Air Quality and Economic Growth in American Cities: 1981-91." Charlotte, N.C.: Center for Interdisciplinary Transportation Studies, UNC-Charlotte, July 30,

1993.

- (322) Harvey, Greig and Elizabeth Deakin. *A Manual of Regional Transportation Modeling Practice for Air Quality Analysis*. Washington, D.C.: National Association of Regional Councils, July 1993. Report number: Version 1.0.

- (323) Hawthorn, Gary. "Transportation Provisions in the Clean Air Act Amendments of 1990." *ITE Journal* (April 1991): 17-24.

The Clean Air Act Amendments of 1990 will have an impact on transportation planning and project development especially in those areas not meeting the National Ambient Air Quality Standards for ozone and carbon monoxide. Other areas where the Clean Air Act will have an effect are VMT growth and congestion problems which impact future emissions; general transportation-related provisions; transportation-related provisions for ozone nonattainment areas; transportation-related provisions for carbon monoxide nonattainment areas; and conformity.

- (324) Hawthorn, Gary and Elizabeth Deakin. *Conference Summary: Best Practices for Transportation Modeling for Air Quality Planning*. Arlington, Va., November 21, 1991. Washington D.C.: National Association of Regional Councils, December 1991.

This paper provides a summary of the NARC conference, "Best Practices for Transportation Modeling for Air Quality Planning," where issues raised by the analysis provision of the Clean Air Act of 1990 (CAA) and general issues pertaining to transportation modeling were discussed. The first section of this report gives an overview of the conference sessions. The second section of this report provides some general observations that emerge from the conference discussions. The third section summarizes the five key points made from the sessions.

- (325) Hawthorn, Gary and Michael D. Meyer. "1990 Clean Air Act Amendments Transportation Provisions: Questions & Answers." Washington, D.C.: American Association of State Highway and Transportation Officials, February 1992.

This report addresses 25 issues in a question and answer format pertinent to the 1990 Clean Air Act Amendment's transportation provisions. Specifically, this report looks at CAAA issues that are relevant to State DOTs and tries to provide guidance.

- (326) Hawthorn, Gary and Michael D. Meyer. "Action Guide for the 1990 Clean Air Act Transportation Provisions." Washington, D.C.: American Association of State Highway and Transportation Officials, February 1992.

This report is a reference for quickly determining transportation provisions and their deadlines, plus required planning and implementation actions as outlined

in the CAAA transportation requirements for ozone and CO nonattainment areas.

- (327) Hawthorn, Gary and Michael D. Meyer. "A User-Friendly Guide to the Transportation Provisions of the 1990 Clean Air Act Amendments." Washington, D.C.: American Association of State Highway and Transportation Officials, February 1992.

This report analyzes the particular provision of the CAAA that will directly affect transportation planning/programming decisions. This report's goal is to: "(1) increase the understanding of transportation-related provisions of this complicated statute, (2) allow agencies to assess for themselves the Act's possible impact on ongoing programs, and (3) improve the response of the transportation community to some of the Act's most challenging requirements."

- (328) Hayes, Adam J., Danielle E. Haas and M. O. Rodgers. "Motor Vehicle Activity Factor Determination Through Fuel Consumption Analysis: Atlanta, Georgia." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 215-224. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (329) Heiken, J. G., B. S. Austin, D. S. Eisinger, S. B. Shepard and L. L. Duvall. *Estimating Travel and Emission Effects of TCMs (Draft)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, September 30, 1991. Report number: SYSAPP-91/117.

This workbook provides a step-by-step approach to estimating the travel and emissions changes that could result from implementing a number of Transportation Control Measures.

- (330) Heiken, Jeremy G., Julie L. Fieber, Steve Vu and Tom L. Darlington. *Development of Specifications for a Nonroad Emissions Model, Final Report*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, September 30, 1993.

This report, which describes the specifications for a nonroad emissions model, forms the basis for the Emission Planning and Strategies Division's (EPSD) current work on development of the nonroad model itself. EPSD, in conjunction with the Certification Division, is revising, where necessary, the specifications described in the SAI report to ensure that the resulting nonroad model meets the requirements of eventual users.

- (331) Helali, Khaled and Bruce Hutchison. "Improving Road Link Speed Estimates for Air Quality Models." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940520.

- (334) "High Occupancy Vehicle Lanes." *Transportation Control Measure Information Documents*. Washington, D.C.: U.S. Environmental Protection Agency, March

1992. Report number: 400-R-92-006.

- (335) *High Occupancy Vehicle System Plans as Air Pollution Control Measures*. Sacramento, Calif.: California Air Resources Board, May 1991.
- (336) Highway Design Division, Environmental Section. "The 1990 Clean Air Act Amendments and the Impact to the State Department of Highways and Public Transportation." Austin, Tex.: Texas Department of Transportation, April 1991.
- (337) Horowitz, Joel L. *Air Quality Analysis for Urban Transportation Planning*. Cambridge, Mass.: MIT Press, 1982.
This book is often cited as a basic reference for the study of the relationship of air quality to mobile sources. It discusses the Clean Air Act and the National Ambient Air Quality Standards, including a description of each criteria pollutant and its effects on humans. This book describes the emissions control systems on vehicles and transportation control measures to limit vehicular exhaust. This book also describes atmospheric dispersion modeling.
- (338) "HOV=HOAX: Can Adding New Highway Lanes Really Reduce Car Traffic?" *Auto-Free Press* 4, 5 (May 1993).
- (339) Hsu, Shi-Ling and Daniel Sperling. "The Uncertain Air Quality Impacts of Automobile Retirement Programs." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940762.
- (341) "Implementation Strategy for the Clean Air Act Amendments of 1990." Research Triangle Park, N.C.: Office of Air and Radiation, U.S. Environmental Protection Agency, January 15, 1991.
This report outlines the EPA's implementation strategy for the CAAA for the next two years as legislated by Congress.
- (342) *Implementation Strategy for the Clean Air Act Amendments of 1990 (Update, 1992)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, July 1992. Report number: 400-K-92-004.
This document outlines EPA's CAAA implementation priorities for the following year. It is updated annually.
- (343) *Implementation Strategy for the Clean Air Act Amendments of 1990 (Update, 1993)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 1993. Report number: EPA 410-K-93-001.
This document outlines EPA's CAAA implementation priorities for the following year. It is updated annually.

- (344) *Implementation Strategy for the Clean Air Act Amendments of 1990: Update, May 1994*. Washington, D.C.: U.S. Environmental Protection Agency, May 1994. Report number: EPA 410-K-94-001.

This report presents highlights of the past year's activities and a summary of achievements to date. It also provides a cumulative list of actions taken to implement the 1990 Clean Air Act Amendments and a two-year projection of future activities.

- (345) *Implementation Strategy for the Clean Air Act Amendments of 1990: Update, November 1994*. Washington, D.C.: U.S. Environmental Protection Agency, November 1994. Report number: EPA 410-K-94-002.

This report presents highlights of the past year's activities and a summary of achievements to date. It also provides a cumulative list of actions taken to implement the 1990 Clean Air Act Amendments and a two-year projection of future activities.

- (346) "Implications of Recent Photochemistry Developments." *Ambient Monitoring Technology Information Center 2, 2* (March 1992).

This article summarizes the important results or implications of the work of Dr. Graham Johnson, an atmospheric photochemist from Australia. Dr. Johnson has been working on an Australian observational model to project NOx limited areas. He uses a unique clean smog chamber to analyze photochemical mechanisms in lower concentration regimes unavailable to U.S. researchers. Also, through the development of his new conceptual basis for examining and using data from his research, Dr. Johnson has developed a new hybrid modeling/monitoring system for assessing ozone nonattainment areas.

- (348) *Initial Mass Exhaust Emissions Results from Reformulated Gasolines*. [Atlanta]: Auto/Oil Air Quality Improvement Research Program, December 1990. Report number: Technical Bulletin No. 1.

- (352) International Energy Agency. *Electric Vehicles: Technology, Performance and Potential*. Paris: Organisation for Economic Co-operation and Development (OECD), 1993.

This study was undertaken to analyze major issues which affect electric vehicle performance and to identify research and development needs. This study also appraises the potential for technology improvements and probable impacts of electric vehicles on energy, environmental, and economic issues.

- (356) *Issues and Approaches to Improving Transportation Modeling for Air Quality Analysis*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, January 1993. Report number: EPA-452/R-93-003; PB93-194066/WTS.

The purpose of this work was to produce a list of current shortcomings

both in transportation model structure and in the ways transportation models are used, written in large part from the perspective of air quality modelers. The intention has been to provide a document which would be of use to both transportation and air quality modelers. In addition, a list of improvements to either the models or transportation modeling procedures, augmented by sample model runs demonstrating implementation of some of these suggestions, is provided.

- (358) Jeffries, H. E., M. W. Gery and W. P. L. Carter. *Protocols for Evaluating Oxidant Mechanisms for Urban and Regional Models*. Research Triangle Park, N.C.: Atmospheric Research and Exposure Assessment Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, June 1992. Report number: EPA 600/R-92/112.

A task force and a number of other researchers came together to develop a criteria to follow when evaluating photochemical reaction mechanisms for their suitability for use in EPA air quality models.

- (359) JHK & Associates and Balloffet & Associates. *CM/AQ Evaluation Model: Final Report and User's Guide*. Prepared for the Denver Regional Council of Governments, May 1994.

- (361) Johnston, Robert A. and Caroline J. Rodier. "A Critique of MPO Capabilities for Modeling TCMS in California." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940199.

- (362) Jones, K. H. "The Truth About Ozone and Urban Smog." Washington, D.C.: Cato Institute, February 19, 1992. Report number: Policy Analysis no. 168.

- (363) Jones, Russell O. and Thomas J. Lareau. "Meeting The Oxygenate Requirements of the 1990 Clean Air Act Amendments." Washington, D.C.: American Petroleum Institute, June 1991. Report number: Research Study #058.

This report looks at the oxygenate requirements of the 1990 CAAA and the uncertainties and obstacles the petroleum industry faces in implementing these requirements.

- (365) Kellam, Robert G. "Emission Inventories for Hazardous Air Pollutants (HAPs) in the Aerometric Information Retrieval System (AIRS)." Memorandum, 1993.

- (366) Kelly, Nelson A. and Peter J. Groblicki. "Real-World Emissions from a Modern Production Vehicle Driven in Los Angeles." *Air & Waste* 43, 10 (October 1993): 1351-1357.

- (368) Kenworthy, J. R. and P. W. G. Newman. "The Ecology of Urban Driving I - Methodology." *Transportation Research-A* 26A, 3 (1992): 263-272.

This article develops a framework for sampling driving patterns to explain/demonstrate the urban ecological (interaction between people) components of driving patterns. The article focuses on a study of Perth, Western Australia, where the authors perform a travel survey and combine the surveys with traditional engineering methods for comparative purposes.

- (369) Kenworthy, J. R., P. W. G. Newman and T. J. Lyons. "The Ecology of Urban Driving II - Driving Cycles Across a City: Their Validation and Implications." *Transportation Research-A* 26A, 3 (1992): 273-290.

This report analyzes the link between urban ecology (human factors) and driving pattern cycles. Using homogeneous urban areas (Perth, Western Australia), information is collected on driving pattern cycles. Specifically, morning, evening, and off-peak driving patterns are identified for the entire city. Driving pattern cycles are confirmed by connecting them to the urban ecology of Perth utilizing a simple traffic events model (intersection and vehicle-related events).

- (372) Khurshudyan, L. H., W. H. Snyder, I. V. Nekrasov, R. E. Lawson, Jr., R. S. Thompson and F. A. Schiermeier. *Flow and Dispersion of Pollutants within Two-Dimensional Valleys: Summary Report on Joint Soviet-American Study*. Research Triangle Park, N. C.: U.S. Environmental Protection Agency, August 1990. Report number: EPA/600/S3-90/025.

- (373) Kimbrough, E. Sue and Steven Bromberg. "The Development of an Encyclopedia of Methods for Emission Inventory Preparation." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 68-79. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (374) Kinnear, James W. "Clean Air at a Reasonable Price." *Issues in Science and Technology* (December 1991): 28-31.

This article criticizes federal legislation aimed at reducing tailpipe emissions from cars and trucks through reformulated fuels. The author feels that Congress, under pressure from other groups, acted without looking at how expensive reformulated fuels would be, how much they would really reduce emissions, or how cost-effective they would be compared to other possible measures. The author goes on to discuss other ways to reduce emissions.

- (375) Kishan, S. *Summary of CO Emissions Calculation Methodology in MOBILE4: Technical Note*. Austin, Tex.: Radian Corporation, December 19, 1989.

This report analyzes how the EPA's MOBILE5 emission factor model determines CO emissions.

- (376) Kishan, S. and T. H. DeFries. "EVAP3.0 CRC Evaporative Emission Model: User's Manual." Austin, Tex.: Radian Corporation, February 5, 1993. Report number: 245-052-01-00.

This report provides guidelines for installing and using the CRC-Radian EVAP3.0 emissions model which calculates hot-soak and diurnal emissions for an average vehicle in a year based on dispensed RVP, driving patterns, fuel weathering, fuel tank level effects, diurnal temperature profile, and tank temperature.

- (377) Klausmeier, Rob, Rick Baker and Blake Stapper. *Emission Reductions from Using Alternative Transportation Fuels*. Austin, Tex.: Texas Air Control Board, February 24, 1993.

- (378) Kumar, Ashok and Sumeet Mohan. "Use of Bulletin Board System for Air Quality Modeling." *Environmental Progress* 10, 1 (February 1991): 8-11.

This article reviews the EPA's Support Center for Regulatory Air Models (SCRAM) and its Bulletin Board System (BBS) which was developed to inform air pollution modelers on current emission models and EPA guidelines. The BBS provides information on CHIEF, CAA, and EMTIC. The SCRAM BBS allows remote PC users access to modeling knowledge and information.

- (379) Langstaff, John E., Jeffrey R. Harrington, Katherine A. McAuliffe and Zion S. Wang. "Technical Memorandum: Uncertainty Investigation of Emissions Inventories." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, September 1992. Report number: SYSAPP-92/122.

This report presents the first phase of a study using the Urban Airshed Model (SAI, 1990; SAI, 1991; EPA 1991a) to determine the effects of different levels of uncertainties in VOC, NO_x and CO emissions estimates for broad source groups (mobile sources, low-level stationary sources, elevated point sources, and biogenic sources) on future emissions control strategies designed to achieve attainment of the ozone national ambient air quality standards (NAAQS). This study focused on two urban areas (Detroit, Michigan and St. Louis, Missouri) and two broad source groups (mobile source VOC and low-level stationary source VOC) in order to provide initial answers and to assess the usefulness of this modeling approach.

- (381) Lawrence, Michael F. "Emissions and Air Quality Impacts of IVHS Actions (Non-technical IVHS Issue Paper for TSC)." Prepared for TRB Committee on Transportation and Air Quality Modeling, January 11, 1992.

Consists of text in outline (bullet) format and a chart.

- (382) Laxton, Bill. "Supplemental Guidance Emissions and Modeling Related Issues." Memorandum on Issues Associated with the 1990 Base Year Emission Inventory and Modeling, December 26, 1991.

This document provides guidelines and information concerning issues in the development of the 1990 Base Year Emission Inventory and in preparing emissions inputs for photochemical model applications. It is categorized into five question and answer categories: base year emission inventory, inventories needed for model evaluation/regional use, emissions modeling parameters, reasonable further progress (RFP) issues/allowable emissions, and mobile emissions.

- (383) Laxton, William G. and John Calcagni. "Information Copy of El Paso-Juarez PM-10 Modeling Scoping Study." Memorandum to A. Stanley Meiburg, Director, Air, Pesticide and Toxics Division, Region VI, December 26, 1991.

The Model Clearinghouse completed its review and provides comments on the Modeling Program for the PM-10 State Implementation Plan Development for the El Paso-Juarez Airshed.

- (385) LeBlanc, David C., Michael D. Meyer, F. Michael Saunders and James A. Mulholland. "Carbon Monoxide Emissions from Road Driving: Evidence of Emissions Due to Power Enrichment." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940561.

- (386) Lee, Sibok, James J. Dale, Kethireddipalli S. Rao, Young-Ihn Lee and Raymond A. Krammes. *Fuel Savings from Surveillance, Signing, and Signal Control Systems for Freeway Congestion Reduction (Final Technical Report)*. Sponsored by Energy Research in Applications Program-1988, administered by the Texas Higher Education Coordinating Board. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, March 1993. Report number: Research Report 02340-1.

- (387) Lefohn, Allen S., Jannell K. Foley, Douglas Shadwick and Beverly E. Tilton. "Changes in Diurnal Patterns Related to Changes in Ozone Levels." *Air & Waste* 43, 11 (November 1993): 1472-1478.

- (389) Legg, Bill. "A Public/Private Partnership in Transportation Demand Management." Paper Submitted for Presentation at the 71st Meeting of the Transportation Research Board, Washington D.C., January 12, 1993.

This report provides a historical background for the Commuter Challenge Program, a Seattle, Washington based program that is "a public/private cooperative effort" to raise public awareness and to get employers involved in influencing their employees' commuting habits by providing incentives to ride share. This report provides a detailed outline on this program's structure, activities, and its impact on ride sharing.

- (390) Leiby, Paul N. *A Methodology for Assessing the Market Benefits of Alternative Motor Fuels: The Alternative Fuels Trade Model*. Oak Ridge, Tenn.: Oak Ridge National Laboratory, September 1993. Report number: ORNL-6771.

This report provides an overview of the Department of Energy's program to promote the development and use of domestic replacement fuels in light duty vehicles. The Energy Policy Act of 1992 requires the DOE to create a program that analyzes the use of large volumes of replacement fuels in the years 2000 and 2010.

- (391) Leman, Christopher K. "Does HOV Lane Construction Really Clean the Air?" *Newsline: Current Research in Public Transportation* 18, 3 (September 1992).

- (392) Leman, Christopher K., Kristin Pauly and Preston L. Schiller. "Rethinking H.O.V.: High Occupancy Vehicle Lands and the Public Interest." n.p., May 1993.

- (393) Levine, Jerrold L. "Determining Alternative Fuels Strategies." *TR News* (May 1990): 27-31.

- (394) *Lifetime Emissions for Clean-Fuel Fleet Vehicles*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, October 1993. Report number: EPA-AA-SRPB-93-01.

This technical report presents EPA's latest version of hydrocarbon emission factors for light-duty clean-fuel fleet vehicles. The report specifically compares the emissions of Inherently Low-Emission Vehicles (ILEVs) to those of basic clean-fuel fleet vehicles.

The report reflects the results of standard runs of MOBILE5a with minor exceptions. At this point, EPA assumes that ILEVs will have the same exhaust emissions as a basic clean-fuel vehicle, regardless of the fuel the ILEV is operated on.

- (395) Lis, James and Kenneth Chilton. *Do Smog Measures Accurately Reflect Air Quality?* St. Louis, Mo.: Center for the Study of American Business, Washington University, May 1993. Report number: Working Paper 150.

This paper criticizes EPA's use of 1988--an unusually hot year--in determining ozone design values for nonattainment designation.

- (397) Lorang, Philip A. "MOBILE5a Input of I/M Program Start Date." Memorandum, October 29, 1993.

MOBILE5a can model two I/M programs within a single run (unlike MOBILE5). If users choose a later date for the second I/M program, MOBILE underestimates the benefits of the program, so EPA is recommending that users do not use MOBILE to model mid-stream changes in an I/M program.

- (398) Loseff, Donald. "Dynamic Ridematching Using Voice Mail." *The Urban Transportation Monitor* (July 24, 1992): 2.

Although employees need their vehicles for non-company functions, on some days carpooling could be a viable option. Through the use of voicemail systems, employees can send messages to a large group of users seeking out carpooling options or even emergency rides. A voicemail ridematching system allows employees to find carpooling options from one day to the next.

- (399) Loudon, William R. and Deborah A. Dagang. "Predicting the Impact of Transportation Control Measures on Travel Behavior and Pollutant Emissions." Paper prepared for presentation at Transportation Research Board 1992 Annual Meeting, January 1992.

- (400) Loudon, William R. and Deborah A. Dagang. "Evaluating the Effects of Transportation Control Measures." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 19-43. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

- (401) Loudon, William and Malcolm Quint. "Integrated Software for Transportation Emissions Analysis." In *Transportation Planning and Air Quality: Proceedings of the National Conference*, edited by Wayson, Roger L., 161-178. Santa Barbara, Calif., July 28, 1991. New York: American Society of Civil Engineers, 1992.

- (402) Loudon, William and Malcolm Quint. "Predicting Pollution." *Civil Engineering* 63 (April 1993): 66-67.

Briefly discusses the relationship of air quality and transportation modeling, and the models JHK has developed.

- (403) Lovelace, Bill, Lesha Hrynychuk and Fred Medina. *Methodology for Estimating Emissions from On-Road Motor Vehicles, Volume II: Weight (E7FWT) (Draft)*. Sacramento, Calif.: California Air Resources Board, June 1993.

This document describes the weight program that is used with EMFAC, California's emission factor model. The weight program provides EMFAC with estimates of vehicle mileage accumulation and with weighted fractions of vehicle activity (VMT, number of trips, or vehicle population) by model year.

- (404) Lynch, Teresa M., Terri Young, Karen N. Johnson, Daniel Bowman, Jill Vitas, Terry Wilson, Ajay Chadha and Lois Alpern. *Economic Growth Analysis System: Reference Manual (Final Report)*. Research Triangle Park, N.C.: Air and Energy Engineering Research Laboratory, U.S. Environmental Protection Agency, April 1993. Report number: EPA-600/R-067a.

This report combines the work of four work assignments under EPA

Contract No. 68-D9-0713. Its goal was to set forth the development of a prototype Economic Growth Analysis Systems (E-GAS) modeling system. This report provides a detailed design and development of the E-GAS model. E-GAS is capable of determining emissions inventories of volatile organic compounds, nitrogen oxide, and carbon monoxide for ozone nonattainment areas and Regional Oxidation Model (ROM) modeling areas.

- (405) Lyons, Carol E., Jonathan L. Bridges and Butch Fries. "Quantifying the Emissions Reductions and Costs of Oxygenated Fuels." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 651-662. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (406) Lyons, William M. "The FTA-FHWA MPO Reviews -- Planning Practice under the ISTEA and the CAA." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940639.
- (407) Maertz, Ron. *Sacramento 1991 Air Quality Attainment Plan, Volume 5: Transportation Control Measures Program*. California: SMAQ, July 24, 1991.
- (409) Maldonado, Hector, Fred Medina, Nat Kong, Tom Lusk and Miki Miyashiro. *Methodology for Estimating Emissions from On-Road Motor Vehicles, Volume I: EMFAC7F (Draft)*. Sacramento, Calif.: California Air Resources Board, June 1993.
This report describes EMFAC, California's emission factor model, and its companion programs.
- (410) Mallett, Vickie Lynn. "Vehicle Emissions and Energy Consumption Impacts of Modal Shifts When Latent Travel Demand is Considered." Master's thesis, Texas A&M University, May 1993.
Thesis developed methodologies to estimate vehicle emission and energy consumption impacts of modal shifts to HOV lanes when latent travel demand is considered. Results of the study indicate that reduced VMT does not necessarily cause reduced emissions of all three mobile source pollutants, even when latent travel demand is not considered.
- (411) Mangat, Tirlochan S., Terry A. Story and Thomas E. Perardi. "Developing Present and Future Year Emissions Inventories Using Rule Effectiveness Factors." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 31-38. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (412) *Transportation Impacts of the Clean Air Act: Mobile Source Emissions and Alternative Fuels*, Conference Chair Mark E. Maggio. Ames, Iowa: Midwest

Transportation Center, Iowa State University, July 1991.

Abstracted proceedings of a conference held in Des Moines, July 25-26, 1991.

(414) *Mass Exhaust Emissions Results from Reformulated Gasolines in Older Vehicles.* [Atlanta]: Auto/Oil Air Quality Improvement Research Program, May 1991. Report number: Technical Bulletin No. 4.

(415) Memmott, Jeffery L. *Develop an Improved Energy Module for Use in HPMS.* College Station, Tex.: Texas Transportation Institute, Texas A&M University System, October 1993. Report number: SWUTC/TX-94/30070-1; TTI Research Report No. 30070-1.

This report covers the work during the first year of a project to upgrade the Highway Performance Monitoring System (HPMS) for use in Texas for estimating the current needs of the highway network in Texas and making forecasts of future needs. The objective of the project is to develop an improved energy module to make more accurate estimates of energy consumption and savings attributed to highway investment strategies.

This report documents a series of equations developed to calculate vehicle operating costs. The equations cover vehicle use consumption of fuel, oil, tires, depreciation, and maintenance. The coefficients of these equations are contained in an external data file that can be read and updated without requiring changes to the program in the future. A subroutine to read the coefficient data file is also included.

Recommendations for further work on HPMS are also included. This includes use of HPMS in making short and medium term forecasts, and incorporation of economic analysis in HPMS.

(416) Methier, Ronald. "Georgia's Experience in Preparing the 1990 Baseline Inventory." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 39-48. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

(417) Meyer, Michael D., Michael Rodgers, Catherine Ross, F. Michael Saunders and Carl T. Ripberger. "A Study of Enrichment Activities in the Atlanta Road Network." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 225-233. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

(418) Meyer, Michael D. and Catherine Ross. "Transportation and Air Quality Modeling: Fitting a Square Block into a Round Hole." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 675-685. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (420) Midurski, Theodore P. and Alan H. Castaline. *Determination of Percentages of Vehicles Operating in the Cold Start Mode*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, August 1977. Report number: EPA-450/3-77/023.

This study was undertaken to determine the percentage of cold start operating modes for carbon monoxide modeling. Researchers collected data in the Pittsburgh and Providence regions and found that the cold start fractions vary considerably according to time of day and location within the urban area.

- (421) Milford, Jana B., Dongfen Gao and Antigoni Zafirakou. "Project Summary: Relationships Between Ozone Precursor Levels and Response to Emissions Reductions: Analysis of Regional Oxidant Model Results for the Northeastern United States." Research Triangle Park, N.C.: Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Agency, June 1993. Report number: EPA/600/SR-93/075.

This summary analyzes the results from the Regional Ozone Modeling for Northeast Transport (ROMNET) study to examine the conditions in which alternative control strategies were predicted to be effective in improving air quality.

- (422) Misenheimer, David C., Jill B. Vitas and J. David Winkler. "Integration of Emissions Data Reporting Programs." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 122-132. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (423) "MOBILE5 Information Sheet #2: Estimating Idle Emission Factors Using MOBILE5." Ann Arbor, Mich.: U.S. Environmental Protection Agency, July 30, 1993.

- (424) "MOBILE5 Information Sheet #3: Loaded/Idle Test and ASM Test I/M Credits." Ann Arbor, Mich.: U.S. Environmental Protection Agency, September 15, 1993.

- (427) Mobley, J. David. "Guidance on States' Failure to Submit Ozone and CO SIP Inventories." Memorandum to EPA regional offices, 1992.

This memorandum's purpose is to clarify under what circumstances EPA would consider a state has failed to submit an emission inventory as part of a SIP revision.

- (428) Mobley, J. David. "State Assistance for AIRS/AMS Data Entry of Nonroad and On-Highway Mobile and Biogenic Emission Inventory Data." Memorandum to Chief, Technical and Program Support Branch, Region I; Chief, State Air Programs Branch, Region I; Chief, Air Programs Branch, Regions II-IV, VI, VIII, and X; Chief, Air Enforcement Branch, Region V; Chief, Air, Toxics, and

Radiation Branch, Region V; Chief, Regulation Development Branch, Region V; Chief, Air Branch, Region VII; Chief, Air Planning Branch, Region IX, October 1992.

- (429) Mobley, J. David. "Emission Inventory Branch Activities and Status of O₃/CO SIP Emission Inventory Submissions." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 7-27. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (431) *Model Clearinghouse: FY-92 Summary Report*. Research Triangle Park, N.C.: Source Receptor Analysis Branch, Technical Support Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, October 1992.

This is a summary of activities of the Model Clearinghouse from August 26, 1991 to August 21, 1992. This report summarizes the FY-92 Clearinghouse activities and Clearinghouse responses to categorical modeling problems during FY-92. This report lists Clearinghouse memoranda during this period, provides a memorandum outlining steps used by the Clearinghouse in analyzing PM-10 attainment demonstrations, contains a list of EPA Model Clearinghouse contact personnel, and summarizes Clearinghouse responsibilities, structure, and operational procedures.

- (432) Mohnen, V. A., W. Goldstein and W. C. Wang. "Tropospheric Ozone and Climate Change." *Air & Waste* 43, 10 (October 1993): 1332-1344.

- (433) *More for Less with HOV: The Benefits of High-Occupancy Vehicle Projects*. Washington, D.C.: Institute of Transportation Engineers, November 1992.

- (434) Moretti, Frank. *Mobility and Air Quality*. Washington, D.C.: The Road Information Program, November 1993.

- (436) Morris, Ralph E. and Thomas C. Myers. "User's Guide for the Urban Airshed Model, Volume I: User's Manual for UAM (CB-IV)." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, June 1990. Report number: EPA-450/4-90-007A.

This report provides a history on the UAM and describes the scientific basis for the model.

- (437) Morris, Ralph E., Thomas C. Myers, Ed L. Carr, Marianne C. Causley and Sharon G. Douglas. "User's Guide for the Urban Airshed Model, Volume II: User's Manual for UAM (CB-IV) Modeling System (central model and preprocessors)." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, June 1990. Report number:

EPA-450/4-90-007B.

This report is a user's guide for operating all UAM preprocessors except the wind and emissions mode. An example for running the central UAM is included.

(438) *Motor Vehicle-Related Air Toxics Study*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, December 1992.

(439) *Motor Vehicle-Related Air Toxics Study*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, April 1993. Report number: NTIS no. PB93-182590CBT (\$77).

This comprehensive study summarizes what is known about motor vehicle-related air toxics and presents significant scientific opinion on each issue.

The study was completed May 15, 1992, by the EPA in compliance with the Clean Air Act Amendments (CAAA). It covers the need for, and feasibility of, controlling emissions of toxic air pollutants that are unregulated under the Clean Air Act (CAA) and associated with motor vehicles and motor vehicle fuels. The study considers the means and measures for such controls, and focuses on those categories of emissions that pose the greatest risk to human health or about which significant uncertainties remain.

Hundreds of compounds found in motor vehicle emissions have been identified. The study covers the specific pollutants or pollutant categories that include benzene, formaldehyde, 1,3-butadiene, acetaldehyde, diesel particulate matter, gasoline particulate matter, and gasoline vapors, as well as selected metals and motor vehicle-related pollutants previously identified in Section 112(b) of the CAA.

Topics covered for each pollutant or pollutant category include chemical and physical properties, formation and control technology, emissions, atmospheric reactivity and residence times, exposure estimation, EPA's carcinogenicity assessment, recent and ongoing research, carcinogenic risk, and non-cancer health effects.

There is also a chapter that describes EPA's Integrated Air Cancer Project, aimed at identifying the major carcinogenic chemicals emitted into the air, and the sources of these chemicals. Another chapter describes qualitative changes in toxic pollutant levels with the use of alternative clean fuels such as methanol, ethanol, compressed natural gas, and liquid propane gas.

(440) Naghavi, Babak and Peter R. Stopher. "Remote Sensing, Means, Medians, and Extreme Values: Some Implications For Reducing Automobile Emissions." Paper presented at the 72nd Annual Meeting of the Transportation Research Board, Washington, D.C., January 10, 1993.

Through a remote sensing unit, a study of measuring exhaust percentages of CO and HC from vehicles passing through a single lane roadway was

conducted. The authors concluded that TCMs aimed at "gross polluters" (vehicles with high levels of CO and HC emissions) will have a more significant emissions reduction, due to the fact that more than half the CO was emitted by 6.9% of the vehicles measured and half the HC was emitted by 20% of the vehicles measured ("gross polluters").

- (441) Napton, Mary Luanne and Frederick A. Day. "Polluted Neighborhoods in Texas: Who Lives There?" *Environment and Behavior* 24, 4 (July 1992): 508-526.

This study compares the socioeconomic composition of 40 Texas neighborhoods severely affected by air pollution to 40 randomly selected metro neighborhoods in the state. This study shows that in Texas these neighborhoods are inhabited by middle class working individuals who wish to live closer to their jobs. This finding is in contrast to other studies outside the state who have found that poor, minority people live in these polluted areas.

- (442) National Highway Traffic Safety Administration. *Automotive Fuel Economy Program: Seventeenth Annual Report to the Congress*. Washington, D.C.: U.S. Department of Transportation, January 1993. Report number: DOT HS 807 936, NRM-21.

- (443) Newell, Terry. "Highway Vehicle Emission Estimates." Ann Arbor, Mich.: U.S. Environmental Protection Agency, June 1992.

This white paper was written in response to published criticisms concerning the accuracy of EPA's MOBILE model emissions estimates. This report provides background information on emissions testing by the EPA, and it addresses concerns about the underestimation of in-use emissions, providing information on EPA's planned improvements for the next version of MOBILE (version 5.0).

- (444) Nizich, Sharon V., Mary Ann Grelinger, Carol Green and Garry Brooks. "Review of the 1990 Ozone and CO Emission Inventories." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 49-55. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (445) *Nonroad Engine and Vehicle Emission Study - Report*. Washington, D.C.: Office of Air and Radiation, U.S. Environmental Protection Agency, November 1991. Report number: EPA 21A-2001.

This study is a response to the Congressional directive that EPA quantify the contribution of nonroad sources to ozone and carbon monoxide air pollution and to other pollutants believed to endanger public health.

(446) *NOx Substitution Guidance*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, December 1993.

Section 182(c)(2)(B) of the CAAA allows the substitution of NOx emission reductions for VOC reductions in the post-1996 RFP VOC reduction requirement for serious and above ozone areas. This is allowed only if it can be demonstrated that the NOx emission reductions (in place of VOC reductions) would yield an equivalent ozone reduction. This guidance contains two basic steps: (1) an equivalency demonstration requires that cumulative RFP emission reductions must be consistent with the NOx and VOC emission reductions determined in the ozone attainment modeling demonstration, and (2) specified reductions in NOx and VOC emissions should be accomplished in the interim period between 1996 and the attainment date, consistent with the continuous RFP emission reduction requirement.

(448) Oliver, William Rogers and Edmund L. Dickson. "Evaluation of Motor Vehicle Emissions from the Unocal SCRAP Program." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 250-261. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

(450) Ostria, Sergio J. and Michael F. Lawrence. "Potential Emission and Air Quality Impacts of IVHS." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940969.

(451) "Outreach and Communication Resources." Research Triangle Park, N.C.: Office of Air and Radiation, U.S. Environmental Protection Agency, July 1993.

This is a bibliography covering CAAA topics. Bibliographic categories are as followed: general information - written materials, general information - other formats, and information on specific topics (Green Programs, Stratospheric Ozone Protection, Acid Rain Reduction, Mobile Sources, National Ambient Air Quality Standards (NAAQS) Attainment, Air Toxics Reduction, Indoor Air/Radon/Electromagnetic Fields, and Radioactive Waste and Emergency Response).

(452) Outwater, Maren L. and William R. Loudon. "Travel Forecasting Guidelines for the Federal and California Clean Air Act." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940378.

(453) "Ozone and Carbon Monoxide Areas Designated Nonattainment." Research Triangle Park, N.C.: Policy Development Section, Ozone/Carbon Monoxide Programs Branch, Air Quality Management Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, October 26, 1991.

The purpose of this report is to summarize the action taken with respect to

designations and classifications of ozone and carbon monoxide areas by the EPA published in the Federal Register in November 1991.

- (454) Parker, Terry, Pam Burmich and Marc Fioravanti. "The Land Use - Air Quality Linkage: How Land Use and Transportation Affect Air Quality." Sacramento, Calif.: California Air Resources Board, 1994.

"This report summarizes data currently available on the relationships between land use, transportation and air quality. It also highlights land use strategies that can help to reduce the use of the private automobile. And, it briefly summarizes several research projects funded by the California Air Resources Board (ARB). As new data becomes available, it will be added to updated versions of this report."

- (455) Paselk, Ted A. and Fred L. Mannering. "Use of Duration Models for Predicting Vehicular Delay at U.S./Canadian Border Crossings." Paper Submitted for Presentation at the 72nd Meeting of the Transportation Research Board, Washington D.C., January 10, 1993.

Vehicular congestion at the U.S. and Canadian border crossing between Washington state and British Columbia is such a problem that alternatives are being gathered to provide some relief for motorists. One alternative is to estimate delay times and then inform motorists so they can select among alternative border crossing sites, or delay their trips. This report utilizes duration models to approximate vehicular delay and show the usefulness of such models as a basis for a fully automated motorist information system.

- (456) Paul, John A. "Urban Air Quality: The Problem." *EPA Journal* 17, 1 (January 1991): 24-26.

- (457) Pearson, David F. and Shannon S. Frankel. *Improved Forecasts of Vehicle Size and Age Distribution and the Impact on Energy Consumption and Vehicle Emissions*. College Station, Tex: Southwest Region University Transportation Center, Texas Transportation Institute, Texas A&M University System, December 1993. Report number: Research Report 60030-1; SWUTC/93/60030-1.

Methodology for projecting future distributions of vehicles by age and type (size) for 10 Texas metropolitan statistical areas (MSA's) consisting of 31 counties is documented in this report. Each county was analyzed for historical data pertaining to population, number employed and unemployed, income, and household size. The number of vehicles registered by model year and vehicle weight were gathered for each county. Distribution of vehicles by age and type (size), and trends in vehicle ownership were compiled and analyzed. Vehicle emissions and energy consumption was then evaluated from projections provided by the data for the mix of vehicles by age and size for the years 2000, 2010, and 2020.

- (458) Pierce, Thomas E. and Keith A. Baugues. *User's Guide to the Personal Computer Version of the Biogenic Emissions Inventory System (PC-BEIS)*. Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, Office of Air and Radiation, U.S. Environmental Protection Agency, July 1991. Report number: EPA-450/4-91-017.

The Personal Computer - Biogenic Emissions Inventory System (PC-BEIS) assists users in determining hourly emissions of biogenic non-methane hydrocarbon emissions for counties throughout the United States. PC-BEIS takes into account land use, leaf biomass, and emission factors on emission rates. It also includes adjustments due to temperature and sunlight. PC-BEIS was compiled using Microsoft FORTRAN and the source code was written in ANSI FORTRAN 77. PC-BEIS is transferable to IBM compatible computers and most other computers.

An updated Biogenic Emission Inventory Guidance document is available from EPA BBS, file name=bioupdat.txt.

- (464) *Position Paper on the Immediate Need For Effective National In-Service Technician I & M Training Program Standards*. Washington, D.C.: Coalition for Safer, Cleaner Vehicles (CSCV), October 6, 1992.

This report addresses the issues involved with mandated enhanced vehicle emissions inspections (I&M) beginning in 1995 and their effectiveness in emissions control. Specifically, the increased demand for vehicle repairs (it is estimated that 8 - 12 million cars will not pass I & M inspections) not keeping pace with inspection techniques and complex high-tech vehicles. This paper suggests that citizens will not tolerate these expenses and inconveniences which could cause a rejection of I & M programs.

- (466) *PPAQ, Post-Processor for Air Quality Analysis: Program Documentation, Version 1.3*. Montville, N.J.: Garmen Associates, September 1991.

- (467) Price, James H. and Tom Porter. "Technical Memorandum: A Bibliography of Tunnel Studies and Related On-Road Vehicle Emission and Model Assessment Data." May 1991.

This paper summarizes results of the Van Nuys Tunnel study in 1987 and provides information supporting these results by other tunnel studies, open roadway studies, and urban air studies. The authors determined that vehicle emission calculation techniques underestimated hydrocarbon and carbon monoxide emission values. The authors concluded that tampered or poorly maintained vehicles add to the problem and are underrepresented in the in-use dynamometer tests; that models place a low value on HC emissions underestimating its significance in urban areas; that emission control systems may deteriorate in hot and/or humid climates; and that DFW Airport Tunnel is the best site for a tunnel study in Texas to measure regulated emissions. This paper

provides a fact sheet and a nine page bibliography.

- (469) *Procedures for Emission Inventory Preparation Volume IV: Mobile Sources*. Research Triangle Park, N.C.: Technical Support Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, July 1989. Report number: EPA 450/4-81-026d (Revised).

Procedures are described for compiling the complete comprehensive emission inventory of the criteria pollutants and pollutant sources. These procedures described are for use in the air quality management programs of State and local air pollution control agencies. Basic emission inventory elements - planning, data collection, emission estimates, inventory file formatting, reporting, and maintenance are described. Prescribed methods are presented; optional methods are provided. The procedures are presented in five (5) volumes: Volume I, Emission Inventory; Volume II, Point Sources; Volume III, Area Sources; Volume IV, Mobile Sources; Volume V, Bibliography.

- (470) *Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol I: General Guidance for Stationary Sources*. Research Triangle Park, N.C.: Technical Support Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, May 1991. Report number: EPA 450/4-91-016.

Volume I describes procedures for preparing a countywide inventory of volatile organic compounds (VOC), nitrogen oxides (NO_x), and carbon monoxide (CO) for stationary sources. It is a companion document to Volume II, which describes procedures for converting an annual countywide emission inventory to a detailed inventory needed for photochemical models. This document is an update to the original, (450/4-88-021), published in 1988.

- (471) Gardner, LuAnn, Lyle R. Chinkin, and Jeremy G. Heiken. *Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone, Vol. II: Emission Inventory Requirements for Photochemical Air Quality Simulation Models*. Research Triangle Park, N.C.: Technical Support Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, May 1991. Report number: EPA 450/4-91-014.

This is a companion document to Volume I, which describes procedures for compiling the annual countywide inventory of volatile organic compound (VOC) emissions. Volume II describes procedures for converting the annual countywide emissions inventory to the detailed inventory needed for photochemical models. The detailed inventory contains hourly gridded emissions (by species class for VOC and NO_x) and CO for the days to be simulated in the photochemical model. This document is an update to the original, (450/4-79-018), published in 1979.

(473) *Protocol for Determining the Best Performing Model*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, December 1992. Report number: EPA-454/R-92-025.

EPA uses a standard set of statistical and graphical procedures for analyzing and displaying the performance of air quality simulation models. Advances in statistical methods have allowed a better comparison of models. This document uses a statistical approach in two steps. The first step is a screening test to eliminate models that fail to perform at a minimum operating level. The second step, applied only to models that pass the screening test, uses analysis based on a computer intensive resampling technique called bootstrapping to generate a probability distribution of feasible data outcomes. Comparison of the distributions of composite measures of performance for each pair of models provides evidence of the degree to which one model performs better than other competing models.

(474) *Public Participation Procedures for EPA's Emissions Estimation Guidance Materials (draft)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, May 1994.

These procedures are required by section 130 of the CAA. The draft procedures describe how the public can participate in the development of emissions estimation guidance both by submitting data for review and by reviewing materials submitted by others. EPA's primary emission estimation publication is "Compilation of Air Pollutant Emission Factors" (AP-42). In addition to AP-42, the procedures as drafted provide the public a means to propose revisions to the SPECIATE and FIRE databases and various estimation guidance memoranda and documents. The public is encouraged to submit information for new or revised factors for any air pollutant.

(475) Purdue, Larry J., Dave-Paul Dayton, Joann Rice and Joan Bursey. *Technical Assistance Document for Sampling and Analysis of Ozone Precursors*. Research Triangle Park, N.C.: Atmospheric Research and Exposure Assessment Laboratory, Human Exposure and Field Research Division, U.S. Environmental Protection Agency, October 31, 1991. Report number: EPA/600-8-9/215.

This report provides guidelines pertaining to proposed revisions to Title 40 Part 58 of the Code of Federal Regulations. The proposed revisions pertain to the enhanced monitoring of ozone precursors and meteorological monitoring. This report consists of the following sections: an introduction, methodology for measuring volatile organic ozone precursors in ambient air, methodology for the determination of total nonmethane organic compounds in ambient air, methodology for measuring oxides of nitrogen and total reactive oxides of nitrogen in ambient air, methodology for the determination of carbonyl compounds in ambient air, meteorological monitoring, references, discussion, issues, and selected procedures related to canister sampling, and list of material,

equipment, and vendors.

- (476) Purvis, Charles L. "Air Quality Impacts of a Regional HOV System." Paper presented at the Third National Planning Applications Conference, Dallas, Tex., April 1991.

Describes the San Francisco Bay Area HOV Master Plan in terms of transportation and air quality impacts.

- (477) Quint, Malcolm M. and William R. Loudon. "Transportation Activity Modeling for the San Joaquin Emissions Inventory." Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940657.

- (478) Radian Corp. *Quality Assurance Implementation Instructions and Examples for SIP Inventory Development*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, March 1992.

This report was written to provide technical consulting to state and local air agencies preparing 1990 base year SIP emission inventories. The interim procedures outlined in this document may not conform to future releases of EPA procedures and guidance. These procedures are not meant to supersede any official EPA guidelines.

- (479) Randolph, Randy. *Economic Growth Analysis System: User's Guide (Final Report)*. Research Triangle Park, N.C.: Air and Energy Engineering Research Laboratory, U.S. Environmental Protection Agency, April 1993. Report number: EPA-600/R-93-067b.

This report provides a manual for the prototype modeling system, Economic Growth Analysis System (E-GAS), which will be used to determine emissions inventories of volatile organic compounds, nitrogen oxides, and carbon monoxide for ozone nonattainment areas and ROM modeling regions.

- (481) Reilly, William R. "Capacity and Level of Service Summary of Highway Engineering Practice." Prepared for TRB Committee Study of Impacts of Highway Capacity Improvements on Air Quality and Energy Consumption, December 13, 1993.

Includes text and copies of overhead projection slides.

- (482) Replogle, Michael A. "Improving Transportation Modeling for Air Quality and Long-Range Planning." Paper presented at the 72nd Annual Meeting of the Transportation Research Board, Washington, D.C., January 10, 1993.

- (483) Research Triangle Institute. *AMS-PC Installation Guide*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 26, 1991.

This document is intended to help the user install the AMS-PC program on

his computer. It is not intended to give any instructions on how to use the AMS-PC system other than to boot the program. For information on the use of AMS-PC, refer to the "AMS-PC Program User's Guide".

(484) Research Triangle Institute. *AMS-PC Program User's Guide*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 26, 1991.

(486) Reser, Andrew J., David T. Hartgen and Walter E. Martin. "The Role of Transportation Control Measures in Reducing Air Pollution: MPO Views." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 44-58. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

(487) *Rethinking the Ozone Problem in Urban and Regional Air Pollution*. Washington, D.C.: National Academy Press, 1991.

This book "describes how scientific information can be used to develop more effective approaches to control ozone. It covers the latest data and analysis on how tropospheric ozone is formed, how accurately we are measuring it, deficiencies in efforts to date to control the problem, approaches to reducing ozone precursor emissions that hold the most promise, and what additional research is needed." This book also discusses atmospheric chemistry and how ozone is formed and measured.

(488) *Review of Federal Test Procedure Modifications Status Report*. Research Triangle Park, N.C.: Certification Division, Office of Mobile Sources, Office of Air and Radiation, U.S. Environmental Protection Agency, February 22, 1993.

This status report addresses the progress EPA has made to date in complying with the CAA provisions and the status of future research efforts.

(489) *Revisions to the State Implementation Plan for Inhalable Particulate Matter (PM10): 1991 PM10 SIP for Moderate Area - El Paso*. Austin, Tex.: Texas Air Control Board, November 1991.

(490) *Revisions to the State Implementation Plan (SIP) for Carbon Monoxide (CO): 1992 CO SIP for Moderate Area - El Paso*. Austin, Tex.: Texas Air Control Board, September 1992.

(492) *Revisions to the State Implementation Plan (SIP) for the Control of Ozone Air Pollution: 1993 Rate-of-Progress SIP for Dallas/Fort Worth, El Paso, Beaumont/Port Arthur, and Houston/Galveston Ozone Nonattainment Areas*. Austin, Tex.: Texas Air Control Board, July 16, 1993.

Contains revisions to policies, control strategies, social and economic considerations, and hearing requirements. Contains new sections on the 1993

Rate-of-Progress requirements.

- (493) *Revisions to the State Implementation Plan (SIP) for the Control of Ozone Air Pollution: Redesignation Petition and Maintenance Plan for the Victoria County Ozone Nonattainment Area.* Austin, Tex.: Texas Natural Resource Conservation Commission, July 27, 1994.

This redesignation request includes sections on policy and purpose; principal plan elements; the 1979 ozone control plan and control strategy; information on the 1993 Rate-of-Progress plans for the other Texas nonattainment areas; and other sections.

- (494) "The Role of Ozone Precursors in Tropospheric Ozone Formation and Control (Draft)." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, February 1993.

This report provides an assessment of the most important issues affecting tropospheric ozone pollution and their implications for regulatory programs.

- (498) Sampath, Srikanth, Somitra Saxena and Patricia L. Mokhtarian. "The Effectiveness of Telecommuting as a Transportation Control Measure." Paper presented at the 71st Annual Meeting of the Transportation Research Board, Washington, D.C., January 12, 1992.

This empirical study, the first of its kind, analyzes the emission impacts of telecommuting. Telecommuting programs are "the partial or total substitution of telecommunications, with or without assistance of computers, for the twice daily commute to/from work." Although telecommuting was first envisioned as "computer-based information employees, working from home, full time," many jobs deal with employees telecommunicating part time one to two days a week.

- (500) Saricks, Christopher L. "Present and Future Vehicular Emissions in Urban Areas: In Search of an Accurate Representation of Ozone Precursors from Mobile Sources." Presented at the 72nd Annual Meeting of the Transportation Research Board, Washington D.C., January 10, 1993.

A need will arise among many metropolitan areas to create new or revised air quality attainment and maintenance plans for abating ambient ozone and/or carbon monoxide emissions levels (as required by Title I of the 1990 Clean Air Act Amendments - CAAA). The EPA has provided guidance and programs for metropolitan areas to confidently control carbon monoxide. The author cites a need for further guidance and data on abating secondary emissions such as non-methane hydrocarbons (reactive organic gases - ROG), nitrogen oxides, nitrates, nitrous oxide, and aldehydes. The author looks at the complex problem of controlling these emissions; he gives a brief historical perspective on SIPs and mobile source emissions; he provides a perspective on TCMs; and, finally, he discusses what he calls the modeler's quandary.

- (501) Saricks, Christopher L. and Anant D. Vyas. "New Approaches to Urban-Scale Transportation Emissions Modeling Under the New Clean Air Act." Argonne, Ill.: Argonne National Laboratory, 1991. Report number: 91-88.11.

The purpose of this report is to provide guidelines for planners to improve the estimation of mobile source emissions without going over budget and staying within compliance of the 1990 Clean Air Act Amendments (CAAA). The authors feel that improvement in emissions testing is possible with tools and equipment currently available.

- (503) Schewe, George J., Vincent DiGirolamo and Robert Adams. *Guideline For Modeling Carbon Monoxide From Roadway Intersections*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, October 1990.

The purpose of this report is to provide uniform guidelines for measuring the air quality impacts of vehicular traffic at intersections, and determine if these impacts are within the National Ambient Air Quality Standards for carbon monoxide.

- (505) *Searching For Solutions - A Policy Discussion Series: Examining Congestion Pricing Implementation Issues*. Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation, December 1992. Report number: FHWA-PL-93-008 HPP-13/12-92(5M)E.

This report summarizes the results of a symposium on congestion pricing implementation issues sponsored by the FHWA and the Federal Transit Administration held in Arlington, Virginia, on June 10-12, 1992.

- (506) *Searching For Solutions - A Policy Discussion Series: Exploring the Role of Pricing as a Congestion Management Tool*. Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation, March 1992. Report number: FHWA-PL-92-012 HPP-13/3-92(5M)E.

This report summarizes a FHWA/Federal Transit Administration seminar on the application of pricing principles to congestion management held in Washington D.C. on July 23, 1991.

- (507) *Second Interim Report of the Interagency Commission on Alternative Motor Fuels*. Washington, D.C.: Department of Energy, September 1991. Report number: DOE/CE-92013169; NTIS no. DE92013169/WTS (\$19.50).

- (508) *Section 187 VMT Forecasting and Tracking Guidance*. Washington, D.C.: U.S. Environmental Protection Agency, January 1992.

This guidance is required by Section 187(a) of the CAAA of 1990. It offers the EPA's recommendations on how to forecast and track vehicle miles traveled (VMT) in Moderate and Serious CO non-attainment areas with design values greater than 12.7 ppm at the time of classification. The purpose of this

guide is to help states prepare SIP revisions that EPA can readily propose to approve as meeting the requirements of the CAAA. If a state adheres to this guidance, EPA will propose approval of its SIP. States are encouraged to obtain EPA approval before using methods other than those specified in this guidance in order to avoid later problems.

- (509) Seigneur, Christian. "Understand the Basics of Air-Quality Modeling." *Chemical Engineering Progress* (March 1992): 68-74.

This paper gives a short summary on principal emissions regulation and the physical processes that affect the atmospheric behavior of chemicals. It also discusses air-quality models and the types of input data and processes used to measure emissions.

- (511) Seitz, John S. "Transmittal of NO_x Substitution Guidance." Memorandum to Director, Air, Pesticides and Toxics Management Division, Region I; Director, Air and Waste Management Division, Region II; Director, Air, Radiation and Toxics Division, Region III; Director, Air, Pesticides and Toxics Management Division, Region IV; Director, Air and Radiation Division, Region V; Director, Air, Pesticides and Toxics, Division, Region VI; Director, Air and Toxics Division, Region VII-X, January 5, 1994.

Attached to this memo is the NO_x Substitution Guidance required under Section 182(c)(2)(C) of the CAA. This guidance introduces greater flexibility in developing ozone attainment strategies by utilizing NO_x emission reductions for meeting Reasonable Further Progress (RFP) requirements after 1996.

- (512) Seitz, John S. "Denver Carbon Monoxide Attainment Demonstration." Memorandum, March 21, 1994.

- (513) Seitz, Leonard E. "California Methods for Estimating Air Pollutant Emissions From Motor Vehicles." Paper presented at the 82nd APCA/AWMA Annual Meeting, June 25, 1989.

This paper will contrast California's Direct Travel Impact Model (DTIM) to the more widely used U.S. Department of Transportation program UROAD. Also, the California mobile source emission model EMFAC7/IRS will be contrasted to the EPA's model, MOBILE2.

- (514) Seitz, Leonard E. "The Use and Abuse of DTIM." Paper presented to the Golden West Section Air and Waste Management Association, Santa Mateo, Calif., March 11, 1992.

This paper discusses what DTIM (Direct Travel Impact Model) is, how DTIM can be used and abused, what is needed to run EMFAC7, IRS, DTIM, approaches to travel stratification and DTIM parameterization, and speciation.

- (515) "Selections Pertaining To: Clean Air Act Amendments of 1990." Response #4, February 1993.

This document is a bibliography of materials pertaining to the CAAA which includes abstracts for each entry.

- (516) Seshadri, Pattabi, Hernán de Solminihac and Robert Harrison. "Modification of the QUEWZ Model to Estimate Fuel Costs and Tailpipe Emissions." Paper Submitted for Presentation at the 72nd Meeting of the Transportation Research Board, Washington D.C., January 1993.

The QUEWZ Model, an effective model for predicting the impact of urban highway construction on user costs, is modified to (the PC version) isolate energy consumption (specifically in the vehicle operating costs subroutine) and to report tailpipe emissions. The authors call the new version QUEWZ-E and tested it on a number of Interstate bridge work zones. They found significant emissions problems in these work zones and feel that QUEWZ-E can identify effective construction strategies that will reduce emission levels.

- (517) Shelton, R. B., J. B. Cannon, M. A. Kuliasha, M. S. Bronzini, G. E. Gourville, C. R. Kerley, R. M. Reed and T. J. Wilbanks. *Energy Division Annual Progress Report for Period Ending September 30, 1992*. Oak Ridge, Tenn.: Oak Ridge National Laboratory, April 1993. Report number: ORNL-6750.

This report describes the work by the Energy Division staff during FY 1992. The research is supported by the Department of Energy, numerous other federal agencies, and some private organizations.

- (518) Shoemaker, Bill R. and Edward C. Sullivan. "HOV Lanes and Ramp Metering: Can They Work Together For Air Quality?" Washington, D.C.: Transportation Research Board, January 1994. Report number: Preprint Paper No. 940444.

This paper comments on the analysis process used to assess the air quality impacts of high occupancy vehicle (HOV) lane and ramp metering projects, and examines the degree to which these popular measures are effective and compatible where jointly applied to improve freeway operations. It happens that there exist subtle and potentially perverse interrelationships between HOV lanes and ramp metering. Also, in an environment of worsening congestion, ramp metering has a limited life. Proper management of these respective systems can occur only when they are administered with full acknowledgement of their mutual interdependence, and with a long term view of their relative potential.

- (519) Shrouds, James M. "Conformity and the New Transportation Covenant." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 1-18. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

This paper discusses the greater roles that transportation and air quality

planners share in each other's fields. It also discusses travel trends, air quality trends, and conformity provisions.

- (520) Sierra Research, Inc. *Methodologies for Analysis of Potential Transportation Control Measures (Draft)*. Houston, Tex.: Houston Galveston Area Council, March 8, 1993.
- (521) Sierra Research, Inc. *Analysis of Potential Transportation Control Measures in the Houston-Galveston Area (Draft)*. Houston, Tex.: Houston Galveston Area Council, June 24, 1993.
- (522) Sierra Research, Inc. *Evaluation of MOBILE Vehicle Emission Model*. Washington, D.C.: Federal Highway Administration, December 1994. Report number: FHWA-PD-94-038; DOT-VNTSC-FHWA-94-8.
This report was commissioned by the U.S. Department of Transportation to evaluate the structure and function of MOBILE, and to document changes that occurred among model revisions. This consisted of reviewing succeeding variations to the model to document the basic model structure, identifying changes to existing components (e.g., base emission rates, speed corrections, temperature corrections, etc.), and evaluating the addition of new capabilities (e.g., modeling of oxygenated fuels, resting loss emissions, and evaporative system functional checks). In addition, the impacts of model changes on fleet-average emission factor estimates were quantified under a variety of vehicle operating conditions (e.g., speed, temperature, operating mode, etc.).
- (523) Sierra Research, Inc. and JHK & Associates. *Methodologies for Quantifying the Emission Reductions of Transportation Control Measures*. Prepared for San Diego Association of Governments, October 8, 1991.
- (524) Sierra Research, Inc. and JHK & Associates. *User Manuals for Software Developed to Quantify the Emissions Reductions of Transportation Control Measures*. Prepared for the San Diego Association of Governments, October 8, 1991.
This report contains user's manuals for three computer modules designed to quantify emission benefits of individual transportation control measures. Includes user's manuals for transportation, emissions, and cost-effectiveness modules.
- (525) Sink, Michael and Dexter Russell. "Improving AP-42 Emission Factors." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 562-572. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

- (526) Snow, Heidi. *Cleaner Fuels, Cleaner Vehicles and Altered Driving Habits: New Measures Under the Clean Air Act to Control Pollution from Highway Vehicles*. Washington, D.C.: National Governors' Association, 1992.
- The CAAA of 1990 require changes to the makeup of the national fleet, the kinds of fuel used, and driving behavior. This report explores the major CAA programs that target highway vehicles, such as reformulated and oxygenated fuels, new vehicle emission standards, inspection and maintenance programs, Stage II and Onboard Vapor Recovery Systems, TCMs, and transportation conformity.
- (527) Sobey, Albert J. "Personal Transportation and the Environment: An Automotive View." *TR News* (May 1990): 22-26.
- (528) Southerland, James H. "Introduction to the AP-42 Program." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 539-543. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.
- (530) Spencer, Peter L. "Calling All Consumers; Smog Science." *Consumers' Research* 75, 2 (February 1992): 38.
- This article discusses the lack of scientific understanding behind ozone regulations which can lead to difficulties in knowing exactly how to control the ozone problem or how severe ozone may be in a specific area.
- (531) Sperling, Daniel, Randall Guensler, Dorriah L. Page and Simon P. Washington. "Air Quality Impacts of IVHS: An Initial Review." In *National IVHS and Air Quality Workshop: Pre-Workshop Notebook*. Diamond Bar, Calif., March 29, 1993. Diamond Bar, Calif.: South Coast Air Quality Management District (California), March 1993.
- (532) *Status of Air Pollution Control*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, February 1992.
- (533) Stedman, Donald H. "Interim Report on Vehicle Measurements in El Paso, Texas and Juarez, Mexico." n.p., March 29, 1993.
- (534) Stedman, Donald H., Gary A. Bishop, James E. Peterson, Paul L. Guenther, Iain F. McVey and Stuart P. Beaton. *On-Road Carbon Monoxide and Hydrocarbon Remote Sensing in the Chicago Area, Final Report*. Illinois: ILENR, October 1991.
- (535) Stedman, Donald H. and Jon M. Lesko. "Second Interim Report on the Remote Sensing Study." n.p., May 7, 1993.

- (538) Stephenson, Amy and George B. Dresser. *An Outline of Transportation-Related Requirements for Compliance with the Clean Air Act Amendments of 1990*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, February 1993. Report number: FHWA/TX-92/1279-1; Research Report 1279-1.

This report lists the transportation-related requirements and submittal dates for the Clean Air Act Amendments of 1990 as they pertain to the State of Texas. Texas has four urban areas in nonattainment of federal air quality standards: Dallas-Fort Worth, Beaumont-Port Arthur, El Paso, and Houston-Galveston-Brazoria. Specific requirements for these four urban nonattainment areas are included. Guidance documents for performing required tasks and possible sanctions for failure to comply are also listed.

- (539) Stone, Richard. "NRC Faults Science Behind Ozone Regs." *Science* 255 (January 3, 1992): 26.

Emissions of one ozone precursor, a class of compounds called volatile organic chemicals (VOCs), have been chronically underestimated. This article calls for a "fundamental change" in U.S. ozone reduction strategy.

- (540) Stopher, Peter R. "Predicting TCM Responses with Urban Travel-Demand Models." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 59-75. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

- (542) Strand, Muriel, Tom Lusk, Bill Lovelace, Hector Maldonado, Miki Miyashiro, Dennis Wade and Ed Yotter. *Methodology for Estimating Emissions from On-Road Motor Vehicles, Volume III: BURDEN7F (Draft)*. Sacramento, Calif.: California Air Resources Board, June 1993.

BURDEN is an emissions model developed for use with California's EMFAC emission factor model. BURDEN reads activity factors from data files and multiplies them by EMFAC's emission factors to print out emission estimates by county or by air basin for each of the 13 vehicle classes used in California.

- (543) *Summary of Public Comments and EPA Responses on the Fifth Conference on Air Quality Modeling: March 1991*. Washington, D.C.: U.S. Environmental Protection Agency, February 1993. Report number: Air Docket A-88-04; V-C-1.

A summary of public comments to EPA's proposed changes to the *Guideline on Air Quality Models*. This summary also contains EPA's responses to the comments, and should be read in conjunction with the preamble to the Federal Register notice in 56 FR 5900.

The mobile source section contains comments on CAL3QHC and on the Guideline for Modeling CO from Roadway Intersections.

- (545) *Supplement A to Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources*. Washington, D.C.: U.S. Environmental Protection Agency, January 1991. Report number: AP-42, Supplement A; GPO no. 055-000-00251-7.

Compilation of Air Pollutant Emission Factors, AP-42, reports data on emissions of atmospheric pollutants for which sufficient information exists to establish realistic emission estimates. The highway source data presented in this supplement are based on MOBILE4, a computer program issued by the EPA in March 1989, which estimates fleet emission rates for hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NO_x) for any calendar year between 1960 and 2020. The emission factors for off-highway mobile sources are presented in Section II of the 4th edition of AP-42 (September 1985) and are not revised in this supplement. EPA will issue additional supplements to this volume, updating the emission factors for particulates, transit buses, and off-highway mobile sources, as new data are available.

- (546) *Supplement B to the Guideline on Air Quality Models (Revised) (Appendix W of 40 CFR Part 51)*. Research Triangle Park, N.C.: Office of Air and Radiation, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, February 1993. Report number: EPA-450/2-78-027R.

Supplement B is an update to "Guideline on Air Quality Models." The page number will indicate which pages are to be added and which are to replace previous pages.

- (547) *Supplemental Guidance for I/M Programs: Hotline Services (draft)*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, January 3, 1994.

This document provides guidance for the I/M hotline service required by the I/M program regulations in 40 CFR 51.369(a)(2). State and local agencies must provide this hotline service for basic I/M areas by 1994 and for enhanced I/M areas by 1995. The hotline services should be designed to (1) assist repair technicians with specific repair problems, (2) answer technical questions that arise in the repair process, and (3) answer questions related to the legal requirements of state and federal law with regard to emission control device tampering, engine switching, or similar issues.

- (549) Tang, R. T., S. C. Gerry, J. S. Newsome, A. R. Vanmeter and R. A. Wayland. "User's Guide for the Urban Airshed Model Volume V: Description and Operation of the ROM-UAM Interface Program System." Research Triangle Park, N.C.: Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, June 1990. Report number: EPA-450/4-90-007E.

This is a user guide for the ROM-UAM Interface System which allows ROM model outputs to be used as inputs for meteorological and boundary/initial condition processors.

- (550) Taylor, Dean, Mark Euritt and Hani Mahmassani. *Documentation for CNG Fleet Conversion Cost-Effectiveness Model*. Austin, Tex.: Center for Transportation Research, University of Texas, December 1991. Report number: Research Report 983-1; CTR 3-4/90/1-983-1.

Texas instituted an alternative fuels--primarily compressed natural gas (CNG)--program for public fleet operations beginning in the 1991-92 fiscal year. A life-cycle cost/benefit model for evaluating the economic implications of this action was developed by U.T. at Austin Center for Transportation Research. This report documents the various input data, calculations, and assumptions inherent in the CNG Net Present Value (NPV) model.

Input data with constant values are discussed first and include basic parameters for fuel tank pressures, on-board storage capacity, vehicle conversion costs, number of tanks, etc. Variable input data include the number and types of vehicles, fuel consumption, etc. The next section presents formulas for the internal model calculations. The final section discusses the basic assumptions inherent in the model.

- (551) Texas Alternative Fuels Council. "Administration. 31 TAC Sections 655.1, 655.5, 655.15, 655.20, 655.25, 655.30, 655.35, 655.40, . . . , 655.110 (Proposed)." 18 TexReg 6426, September 21, 1993.

Contains proposed council operating details, definition of terms, proposed bases for consideration of project funding by the council, etc.

The Alternative Fuels Council is charged with the responsibility of coordinating a comprehensive statewide program to support the use of environmentally beneficial alternative fuels in vehicle fleets owned by state and local governments and political subdivisions. The council's leadership should encourage the use of alternative fuels in private fleets. The council's programs are intended to accelerate the transition to alternative fuels and to ease its financial impact on state and local governments.

- (552) Texas Department of Transportation. "Vehicle Emissions Verification System." 18 TexReg 8236, November 9, 1993.

TxDOT has adopted a new section, 17.80, to the TAC that establishes a vehicle emissions verification system to ensure compliance with I/M programs in ozone nonattainment areas. Vehicle owners in ozone nonattainment areas must submit an inspection certificate when registering their vehicles in that county.

This publication contains public comments and responses to the proposed rule as it was published in the August 20, 1993 Texas Register. The adopted rule contains some changes to the proposed rule.

- (557) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles: 30 TAC Section 114.23 (Proposed Change)." 18 TexReg 6424,

September 21, 1993.

Proposed revision to the ozone SIPs for Houston/Galveston, Dallas/Fort Worth and El Paso. The proposed section contains: TCM-specific definitions; designations of affected MPOs responsible for TCM development, funding, and implementation; requirements that MPOs submit specific information provided by agencies or entities responsible for implementation of TCM and a quantification of the emission reduction benefits; requirements that MPOs maintain and provide specific information regarding the status of TCM implementation; requirements that the MPO modify the TIP for the area, as necessary, to correct implementation deficiencies; and prescribed enforcement actions to be taken if deficiencies remain unresolved or if egregious or knowing violations of TCM commitments occur.

- (558) Texas Natural Resource Conservation Commission. "Control of Vehicle Refueling Emissions (Stage II) at Motor Vehicle Fuel Dispensing Facilities: 30 TAC Section 115.241-115.249 (Adopted Amendments)." 18 TexReg 8583, November 19, 1993.

Describes control requirements, alternate control requirements, inspection requirements, testing requirements, recordkeeping requirements, exemptions, training requirements, and counties and compliance schedules.

- (559) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles: 30 TAC Section 114.23 (Adopted Rule)." 18 TexReg 8700, November 23, 1993.

The new rule is a revision to the ozone SIP. The rule basically formalizes the guidance from EPA to assure that TCMs are specific and enforceable. If the MPOs propose TCMs for the SIP which follow this guidance and then fail to produce the required emissions reduction, there are specific alternative measures which need to be applied. If these procedures are carefully followed, it is highly unlikely that enforcement action will be taken against the MPO or implementing agency, unless it is an egregious or knowing violation. Whenever TCMs are submitted, there should be definite commitments, obligation of a funding source, a schedule to plan, implement, and enforce the TCM, and a monitoring program to assess the TCM's effectiveness and to allow for corrections or alterations. The RTC should carefully weigh any reluctance to commit TCMs to the SIP against the possible failure to attain the NAAQS and a possible bump up to a worse category, or the imposition of sanctions by EPA under the provisions of the FCAA.

- (560) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles: 30 TAC Section 114.3 (Adopted)." 18 TexReg 8689, November 23, 1993.

Adopts the repeal of the old Inspection/Maintenance (I/M) Program section of the TAC and adopts a new one. The new section contains I/M

program-specific definitions; prohibitions on the operation of a motor vehicle without satisfying required inspection requirements; prohibitions on the improper issuance of a vehicle emissions certificate; a prohibition of the use or distribution of falsified inspection documents; requirements that I/M program contractors satisfy all applicable provisions of the Texas I/M State Implementation Plan (SIP); requirements that vehicles from state registration and certain fleet vehicles not registered, but primarily operated in an I/M program area comply with the emissions inspection requirements; requirements that federal agencies ensure that vehicles operated by federal employees on property under the agency's jurisdiction comply with the I/M program requirements; requirements that owners of vehicles that are identified by on-road testing submit the vehicle for an out-of-cycle inspection and corrective action; provisions for receipt of minimum expenditure, hardship, and time extension waivers and other general exemptions; and specification of the model years subject to the inspection program and the applicable counties and compliance schedules.

TNRCC concurrently proposed control strategies that will meet or exceed EPA's enhanced I/M program requirements for Houston/Galveston/Brazoria and El Paso, and that will meet or exceed EPA's basic I/M program requirements for Dallas/Fort Worth and Beaumont/Port Arthur.

- (561) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles (Adopted Section)." 18 TexReg 8721, November 23, 1993.

TNRCC adopts new Section 114.23 concerning enforceability of transportation control measures (TCMs). The new rule is a revision to the SIP for ozone nonattainment areas.

- (562) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles: 30 TAC Section 114.21 (Proposed)." 18 TexReg 9167, December 10, 1993.

A proposed amendment to the Employer Trip Reduction (ETR) Program to delay the plan submission dates for employers with 150 or more employees to allow additional time for plan preparation. The additional time is needed due to delays in the development of Employee Transportation Coordinator (ETC) training courses.

- (563) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles (Proposed)." 18 TexReg 9891, December 24, 1993.

TNRCC proposes a Memorandum of Understanding (MOU) with the Texas Department of Transportation (TxDOT). The purpose of the MOU is to enable TNRCC to review TxDOT projects which may affect air quality in order to assist TxDOT in making environmentally sound decisions, and the development of a system by which information developed by TxDOT and TNRCC may be exchanged to the mutual benefit of both agencies.

- (564) Texas Natural Resource Conservation Commission. "Volatile Organic Compound Transfer Operations: Control of Reid Vapor Pressure of Gasoline (Proposed Section)." 19 TexReg 26, January 4, 1994.

TNRCC proposes new sections concerning the control of Reid Vapor Pressure (RVP) of gasoline. The proposed sections are in response to EPA's requirements for the 15 Percent Rate of Progress SIP.

The proposed sections would limit gasoline RVP to 6.5 psi absolute during the summer ozone season. Proposed alternate control requirements which will result in equivalent VOC emission reductions may be approved by the Executive Director. Proposed approved test methods identify federally approved test methods for determining compliance with gasoline RVP limits. There are also proposed sections on recordkeeping requirements, exemptions, and counties and compliance schedules.

- (565) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Volatile Organic Compounds: 30 TAC Section." 19 TexReg 3703, May 13, 1994.

The rule adopting Phase II of the Rate of Progress (ROP) SIP.

- (566) Texas Natural Resource Conservation Commission. "Control of Air Pollution from Motor Vehicles: 30 TAC Section 114.1(b)(3)(A) (Proposed Rule)." 19 TexReg 4007, May 24, 1994.

The TNRCC proposes to delete section 114.1(b)(3)(A), concerning alternative fuel conversions. The subparagraph is proposed for deletion in order to enable fleet operators to continue to convert vehicles to use alternative fuels in accordance with legislative mandates as administered by the TNRCC until the EPA publishes the final rules for vehicle conversions.

- (568) Texas Transportation Institute. *The Dallas Freeway/HOV System: Year 2015 (Final Draft)*. n.p., December 1992.

- (569) Tikvart, Joseph A. "Use of Nonguideline Versions of Urban Airshed." Memorandum to Regional Modeling Contact, Regions I-X, April 26, 1991.

The Lake Michigan Air Director Consortium were granted permission to use modified UAM that came out of their extensive study to improve UAM applications in the Lower Lake Michigan area, including Chicago. This permission was granted without the usual side-by-side type of model performance evaluation requirement, because of their extensive study. EPA regions may receive requests to modify UAM or use the Lower Lake Michigan version. Unless the State plans an extensive study, the UAM must undergo a performance evaluation, pursuant to Section 3.2.2 of the Guideline on Air Quality Models.

(570) Tikvart, Joseph A. "The Ozone Attainment Test in the State Implementation Plan (SIP) Modeling Demonstrations." Memorandum to EPA Region IV, December 15, 1992.

Response to a memo asking EPA if 0.124 was an acceptable target level for ozone attainment demonstrations. EPA responds that they must achieve 0.120 ppm to comply with the NAAQS.

(571) Tikvart, Joseph A. "Draft Protocol for the Urban Airshed Model V (UAM-V)." Memorandum to Brenda Johnson, Meteorologist with EPA Region IV, July 22, 1993.

(572) "Tools for Change: The Clean Air Act Amendments and the Intermodal Surface Transportation Efficiency Act." Washington, D.C.: Surface Transportation Policy Project Resource Guide, July 1992.

This paper provides a statutory and legislative background for the Clean Air Act Amendments of 1990 (CAA) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). Each piece of legislation is discussed. A shift of focus from projects to process are discussed. This paper also looks at the role of citizens in promoting clean air and transportation control measures.

(573) *Traffic Congestion: Activities to Reduce Travel Demand and Air Pollution Are Not Widely Implemented.* Washington, D.C.: U.S. General Accounting Office, November 1992. Report number: GAO/PEMD-93-2.

(574) *Transportation and General Conformity Under the Clean Air Act: Model Rules for State and Local Agencies.* Washington, D.C.: State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials, June 1994.

STAPPA/ALAPCO has developed model rules for both the transportation and general conformity rules to help states develop their conformity SIPs. The STAPPA/ALAPCO models are intended to serve as guidance and offer options for SIP revisions.

(575) *Transportation Efficiency: Tackling Southern California's Air Pollution and Congestion.* Oakland, Calif.: Environmental Defense Fund/Regional Institute of of Southern California, March 1991.

(576) *Transportation Implications of Telecommuting.* Washington, D.C.: U.S. Department of Transportation, April 1993.

(577) *Transportation Programs and Provisions of the Clean Air Act Amendments of 1990: A Summary.* Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation, 1992. Report number: FHWA-PD-92-023;

HEP-41/10/92 (40M) QE.

Brochure describing the transportation related requirements of the CAAA, primarily from Titles I and II. Contains tables that list the requirements for ozone, carbon monoxide, and PM-10 emission reductions.

- (578) "TRB/HRIS Hot Topics Selections Pertaining to: Air Quality or Pollution from Vehicle Emissions 1982-1989." Washington, D.C.: Transportation Research Board, December 1989.
A list of citations, with abstracts, from a TRIS search.
- (579) "TRB/HRIS Hot Topics Selections Pertaining to: Clean Air Act Amendments of 1990." Washington, D.C.: Transportation Research Board, February 1993.
A list of citations, with abstracts, from a TRIS search.
- (580) "TRB/HRIS Hot Topics Selections Pertaining to: Effect of HOV on Air Quality." Washington, D.C.: Transportation Research Board, June 1993.
A list of citations, with abstracts, from a TRIS search on HOV and air quality.
- (581) "TRB/HRIS Hot Topics Selections Pertaining to: Electric Vehicles." Washington, D.C.: Transportation Research Board, 1992.
A list of citations, with abstracts, from a TRIS search.
- (582) "TRB/HRIS Hot Topics Selections Pertaining to: Vehicle Emissions." Washington, D.C.: Transportation Research Board, August 1993.
A list of citations, with abstracts, from a TRIS search.
- (583) Turnbull, Katherine F. *High-Occupancy Vehicle Project Case Studies: History and Institutional Arrangements*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, December 1990. Report number: Technical Report 925-3; UMTA/TX-89/1-925-3.
- (584) Turnbull, Katherine F. *High-Occupancy Vehicle Project Case Studies: Historical Trends and Project Experiences*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, August 1992. Report number: Technical Report 925-4; FTA/TX-89/1-925-4.
- (585) Turnbull, Katherine F., ed. *Fourth National High-Occupancy Vehicle (HOV) Facilities Conference*. Washington, D.C.: Transportation Research Board, December 1990.
Proceedings of a meeting held April 10-12, 1990, in Washington, D.C.

- (586) Turnbull, Katherine F., ed. *Fifth National High-Occupancy Vehicle (HOV) Facilities Conference, HOV Facilities--Coming of Age*. Washington, D.C.: Transportation Research Board, December 1991.
 Proceedings from a conference held April 28-May 1, 1991 in Seattle, Washington.
- (587) Turnbull, Katherine F. and James W. Hanks, Jr. *A Description of High-Occupancy Vehicle Facilities in North America*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, July 1990. Report number: Technical Report 925-1; UMTA/TX-90/925-1.
- (588) Turnbull, Katherine F., Russell H. Henk and Dennis L. Christiansen. *Suggested Procedures for Evaluating the Effectiveness of Freeway HOV Facilities*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, February 1991. Report number: Technical Report 925-2; UMTA/TX-91/925.
- (589) Turnbull, Katherine F., Robert W. Stokes and Russell H. Henk. "Current Practices in Evaluating Freeway High-Occupancy Vehicle Facilities." Presented at the 70th Annual Meeting of the Transportation Research Board, Washington, D.C., January 1991.
- (590) Ubanwa, Basil Nnamdy. *The California Low Emissions Vehicle Program: Vehicle Technologies and Projected Cost Estimates, Appendices B, C, D*. Austin, Tex.: Texas Air Control Board, July 1993.
- (591) Ulberg, Cy and Eldon L. Jacobson. *HOV Lane Enforcement Evaluation*. Olympia, Wash.: Washington State Department of Transportation, January 1993. Report number: WA-RD 281.1.
- (592) Untermann, Richard K. *Linking Land Use and Transportation: Design Strategies to Serve HOVs and Pedestrians*. Olympia, Wash.: Washington State Department of Transportation, June 1991.
- (593) *The Urban Electric Vehicle: Policy Options, Technology Trends, and Market Prospects*. Stockholm, Sweden, May 25, 1992. Paris: Organisation for Economic Co-operation and Development, 1992.
 Proceedings of a conference held in Sweden on electric vehicles. Contains many articles on electric vehicles from many different countries.
- (594) *Urban Transportation: Reducing Vehicle Emissions with Transportation Control Measures*. Washington, D.C.: U.S. General Accounting Office, August 1993. Report number: GAO/RCED-93-169.

- (596) U.S. Congress, Office of Technology Assessment. *Catching Our Breath: Next Steps for Reducing Urban Ozone*. Washington, D.C.: U.S. Government Printing Office, July 1989. Report number: OTA-O-412.

This book describes what ozone is and how it harms people and the environment. It also discusses what is being done to reduce ozone emissions and actions planned for future reductions.

- (597) U.S. Congress, Office of Technology Assessment. *Retiring Old Cars: Programs to Save Gasoline and Reduce Emissions*. Washington, D.C.: U.S. Government Printing Office, July 1992. Report number: OTA-E-536.

Light-duty vehicles--automobiles and light trucks--account for a large portion of urban air quality problems. For example, they produce about half of urban emissions of reactive organic gases (a precursor to ozone) and the preponderance of carbon monoxide emissions. With regulation of new vehicles above the 90 percent control level for the major pollutants and scheduled to become even stricter in the near future, emissions from older vehicles have drawn increasing attention. Although cars of 1971 or earlier vintage made up only about 3.4 percent of the auto fleet in 1990 and were driven less than 2 percent of the miles, the EPA estimates they created at least 6 percent of the hydrocarbon emissions, 7.5 percent of the carbon monoxide, and 4.7 percent of the nitrogen oxides. Further, because older cars generally are much less fuel efficient than new ones, they burn a disproportionate share of gasoline and thus are responsible for a similarly large share of the environmental, economic, and national security effects of gasoline use.

The Union Oil Company (Unocal) has demonstrated a successful program to retire 1970 and earlier vintage cars in the Los Angeles area, removing nearly 8,400 old cars by buying them from their owners for \$700 each and scrapping them. The success of this program has spurred national interest: both the House and Senate have expressed interest, and recently the Administration has proposed a program based on awarding pollution credits to companies that participate. The Subcommittee on Energy and Power of the House Committee on Energy and Commerce asked OTA to examine the costs and benefits of vehicle retirement programs. This report responds to the Subcommittee's request.

- (603) U.S. Environmental Protection Agency. "State Implementation Plan Completeness Review (Final Rulemaking)." 55 FR 5824, February 15, 1990.

This rule describes EPA's criteria for a complete SIP submittal. It provides a procedure and a screening procedure designed to enable states to prepare adequate SIP submittals. This rule also provides procedures to enable EPA reviewers to promptly screen SIP submittals and to return any submittals found incomplete to the states without having to go through a formal rulemaking.

This notice was published prior to the adoption of the 1990 Clean Air Act Amendments. See the August 26, 1991 *Federal Register* notice for the final

rulemaking after the 1990 Amendments were passed.

- (604) U.S. Environmental Protection Agency. "State Implementation Plan Completeness Review (Final Rulemaking)." 56 FR 42216, August 26, 1991.

This rule describes EPA's criteria for a complete SIP submittal. It provides a procedure and a screening procedure designed to enable states to prepare adequate SIP submittals. This rule also provides procedures to enable EPA reviewers to promptly screen SIP submittals and to return any submittals found incomplete to the states without having to go through a formal rulemaking. See the technical correction to this notice, published November 8, 1991 in the *Federal Register*.

- (605) U.S. Environmental Protection Agency. "State Implementation Plans for Nonattainment Areas for Ozone (Notice of finding of failure to submit a required state implementation plan and proposed rule)." 56 FR 54554, October 22, 1991.

The EPA gives notice that it is making a finding, under section 179(a)(1) of the CAA, as amended, for each State listed in Table A, that the State has failed to submit an implementation plan or plan element required under the provisions of the CAA. The notice addresses the requirement under section 182(a)(2)(A) that, within 6 months of the classification of an ozone nonattainment area, States submit certain corrections to VOC regulations for specific ozone nonattainment areas. This notice continues the process initiated in June 1991 when letters were sent by the EPA Regional Offices to 11 States and the District of Columbia notifying each of its failure to make a submittal. Today's notice consolidates these individual regionally-applicable actions for the purpose of providing an opportunity for comment.

- (606) U.S. Environmental Protection Agency. "Designation of Areas for Air Quality Planning Purposes (Final Rule)." 56 FR 56694, November 6, 1991.

This rule sets forth the attainment status, including designations and classifications for selected areas affected by the ozone, carbon monoxide (CO), particulate matter (PM), and lead national ambient air quality standards (NAAQS). The table following this rule set forth, on a State-by-State, pollutant-by-pollutant basis (as appropriate), the attainment status of the above mentioned NAAQS as submitted by the appropriate States, and approved or as designated and classified by the EPA. Designations and classifications revised as a result of technical corrections will be republished.

- (607) U.S. Environmental Protection Agency. "Requirements for Preparation, Adoption, and Submittal of Implementation Plans: Approval and Promulgation of Implementation Plans (Final Rule)." 57 FR 3941, February 3, 1992.

This action adds a general definition of volatile organic compounds (VOC) to EPA's regulations governing the preparation of SIPs which are required

under Title I of the CAA. Today's action also incorporates this definition into various SIP-related rules, including EPA's new source review rules and the Federal implementation plan (FIP) rules for the Chicago area.

- (608) U.S. Environmental Protection Agency. "Approval and Promulgation of Implementation Plan State of Texas Prevention of Significant Deterioration (Final Rulemaking)." 57 FR 28093, June 24, 1992.

This Final Rule approves a revision to the Texas State Implementation Plan (SIP) that includes amendments to the Texas Air Control Board (TACB) Regulation VI, General Rules, a Supplement, and commitment letters, all related to the Prevention of Significant Deterioration (PSD) program. This approval enables the State of Texas to issue and enforce PSD permits directly in most areas of the State without final issuance of those PSD permits by the EPA.

- (609) U.S. Environmental Protection Agency. "Environmental Protection Agency; Memorandum of Understanding (Notice)." 57 FR 34606, August 5, 1992.

The FHWA and the EPA today publish for public information the text of the Memorandum of Understanding (MOU) signed by the FHWA and the EPA to increase cooperation in a number of high priority areas for an environmentally-sound transportation system in the United States.

- (610) U.S. Environmental Protection Agency. "National Ambient Air Quality Standards for Ozone; Proposed Decision." 57 FR 35542, August 10, 1992.

This ruling proposes a review of the standards upon which the current NAAQS for ozone are based. The existing primary and secondary standards for O₃ is set at 0.12 ppm. This ruling proposes under section 109(d)(1) that changes of the primary and secondary standards are not appropriate at this time.

- (611) U.S. Environmental Protection Agency. "Designation of Areas for Air Quality Planning Purposes (Final Rule)." 57 FR 43846, September 22, 1992.

EPA's final action in redesignating some areas or portions of areas to nonattainment for PM-10 and SO₂. There were no new designations for areas in Texas. SEE ALSO the amendments and corrections published November 30, 1992 in the *Federal Register*.

- (612) U.S. Environmental Protection Agency. "Approval and Promulgation of Air Quality Implementation Plans; Texas; Revisions to Volatile Organic Compound Reasonably Available Control Technology Rules (Final Rule)." 57 FR 44124, September 24, 1992.

Notice that EPA accepts and approves Texas' SIP revision after Texas added sections identifying Reasonably Available Control Technology rules for VOCs.

- (613) U.S. Environmental Protection Agency. "Regulation of Fuels and Fuel Additives: Standards for Reformulated Gasoline." 57 FR 46316, October 8, 1992.

Notice of application for extension of the Reformulated Gasoline Program to the Dallas/Fort Worth area in the state of Texas.

- (614) U.S. Environmental Protection Agency. "Notice of Final Oxygenated Fuels Labeling Regulations Under Section 211(m) of the Clean Air Act as Amended (Notice of Final Rulemaking)." 57 FR 47769, October 20, 1992.

The CAAA require various states to implement an oxygenated gasoline program. Any person selling retail oxygenated gas pursuant to the state program must label the fuel dispensing system in accordance with EPA regulations. The labels must say that the gas is oxygenated and that it will reduce mobile vehicle CO pollution. The labeling regulations apply to nonattainment CO areas with design values of 9.5 ppm or more, and they apply during the nonattainment area's control period.

- (615) U.S. Environmental Protection Agency. "Regulation of Fuel and Fuel Additives; Administrator's Finding that No Control or Prohibition on Maximum Oxygen Content of a Winter Oxygenated Gasoline Program is Necessary Under Section 211(c)(4)(A) of the Clean Air Act as Amended by the Clean Air Act Amendments of 1990 (Notice of Proposed Finding)." 57 FR 47849, October 20, 1992.

- (616) U.S. Environmental Protection Agency. "Guidelines for Oxygenated Gasoline Credit Programs and Guidelines on Establishment of Control Periods Under Section 211(m) of the Clean Air Act as Amended (Notice of Availability of Guidance Documents)." 57 FR 47853, October 20, 1992.

Notice provides contact names for acquiring the guidance documents and also provides background information on the oxygenated gasoline program requirements.

- (617) U.S. Environmental Protection Agency. "Standards for Emissions from Natural Gas-Fueled, and Liquefied Petroleum Gas-Fueled Motor Vehicles and Motor Vehicle Engines, and Certification Procedures for Aftermarket Conversion Hardware (NPRM)." 57 FR 52912, November 5, 1992.

This action proposes low- and high-altitude emission standards and test procedures for the certification of natural gas-fueled and liquefied petroleum gas-fueled light-duty vehicles and trucks, heavy-duty engines and vehicles, and motorcycles. Standards would go into effect with the 1994 model year. This notice also proposes fuel economy test procedures and calculations of natural gas-fueled light-duty vehicles and trucks to go into effect with the 1993 model year. These procedures and calculations will allow natural-gas vehicles to be included in the Corporate Average Fuel Economy (CAFE) program.

In addition, this notice proposes requirements for the certification of

aftermarket conversion equipment. The conversion requirements would apply to all conversions, regardless of fuel type.

- (618) U.S. Environmental Protection Agency. "Designation of Areas for Air Quality Planning Purposes; Amendments and Corrections (Final Rule)." 57 FR 56762, November 30, 1992.

The EPA is issuing amendments to the State-by-State designations and classifications for the status of ozone, carbon monoxide (CO), lead, and particulate matter nominally 10 microns and less in diameter (PM-10) areas. These are changes based on information identified by EPA after publication of the original rule which established the current designations and classifications or information that was brought to EPA's attention by comments on the rule.

- (619) U.S. Environmental Protection Agency. "Credit Program for California Pilot Test Program (Final Rule)." 57 FR 60038, December 17, 1992.

This final rule deals only with the program portion of the California Pilot Test program. It assists vehicle manufacturers in meeting clean fuel vehicle sales requirements.

- (621) U.S. Environmental Protection Agency. "[UAM user tips from the EPA bulletin board]." 1993.

This file contains instructions and helpful tips to follow while running the UAM and its support programs.

- (622) U.S. Environmental Protection Agency. "Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Gaseous and Particulate Emission Regulations for 1994 and Later Model Year Light-Duty Vehicles and Light-Duty Trucks, and Revised Performance Warranty Regulations (Proposed Rule)." 58 FR 3380, January 8, 1993.

This rule proposes the addition of a short test to current regulations for certification, audit, and recall of new light-duty vehicles and trucks. This is intended to protect owners of such vehicles from incurring unnecessary repair expenses on Inspection/Maintenance failures due to design of the vehicles' emission systems.

- (623) U.S. Environmental Protection Agency. "Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Regulations for Light-Duty Vehicle and Light-Duty Truck 1994, 1995, and 1996 Model Year Durability Testing Procedures, and 1994 and Later Model Year Allowable Maintenance (Final Rule)." 58 FR 3994, January 12, 1993.

This rule revises previous durability procedures and allowable maintenance provisions in the federal motor vehicle emission certification regulations. It includes durability procedures for the certification of vehicles

subject to Tier I tailpipe standards (published June 5, 1991). The new durability procedures are similar to the procedures used in California.

- (624) U.S. Environmental Protection Agency. "California State Motor Vehicle Pollution Control Standards; Waiver of Federal Preemption; Decision." 58 FR 4166, January 13, 1993.

This ruling grants California a waiver of Federal preemption pursuant to section 209(b) of the CAAA to enforce amendments to its motor vehicle emission standards and test procedures to phase in more stringent LEV standards for light duty vehicles.

- (625) U.S. Environmental Protection Agency. "Clean Fuel Fleet Credit Programs, Transportation Control Measure Exemptions, and Related Provisions (Final Rule)." 58 FR 11888, January 22, 1993.

Provisions of the Clean Air Act Amendments enacted in 1990 require the establishment of a Clean Fuel Fleet Program to reduce emissions of ozone precursors, especially non-methane organic gases and oxides of nitrogen, through the introduction of lower-polluting vehicles in specified areas. Under this program, some of the new vehicles purchased by certain fleet owners located in covered areas (certain ozone and carbon monoxide nonattainment areas) will be required to meet clean-fuel fleet vehicle (CFFV) exhaust emission standards.

- (626) U.S. Environmental Protection Agency. "Ambient Air Quality Surveillance (Final Rule)." 58 FR 8452, February 8, 1993.

This final rule revises the ambient air quality surveillance regulations (40 CFR Part 58) to include provisions for the enhanced monitoring of ozone and its precursors including oxides of nitrogen, volatile organic compounds (including carbonyls) and meteorological parameters. These revisions satisfy the requirements of Title I, Section 182 of the 1990 Clean Air Act Amendments. These revisions require States to establish photochemical assessment monitoring stations (PAMS) as part of their State Implementation Plan (SIP) monitoring network in ozone nonattainment areas classified as serious, severe, or extreme. Included in these revisions are minimum criteria for network design, monitor siting, monitoring methods, operating schedules, quality assurance, and data submittal.

- (627) U.S. Environmental Protection Agency. "Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Regulations Requiring On-Board Diagnostic Systems on 1994 and Later Model Year Light-Duty Vehicles and Light-Duty Trucks (Final Rule)." 58 FR 9468, February 19, 1993.

This rule requires vehicle manufacturers of light-duty vehicles and trucks to install on-board diagnostic systems beginning with the 1994 model year. These systems will monitor emission control components and inform the driver of any

malfunctions. The systems will also store diagnostic information in the vehicle's computer to assist the mechanic.

- (628) U.S. Environmental Protection Agency. "Interim Guidance on the Generation of Mobile Source Emission Reduction Credits." 58 FR 11134, February 23, 1993.

This action proposes interim guidance for States and other interested parties on the general principles for creating emission reduction credits through the surplus control of mobile sources. This guidance addresses key issues involved in the generation of mobile source emission reduction credits, including the calculation of emissions baselines for participating sources, the projection of future emissions levels, and the time-averaging of emission reduction credits that vary over time. This action also provides guidance on the treatment of secondary emissions changes resulting from the subject mobile source controls and the discounting of the credits to reflect the level of uncertainty surrounding the actual level of mobile source emissions reduction likely to be realized by the proposed control program and the use of an environmental bonus to ensure that the production of the mobile source emissions reduction credit yields a direct benefit to the environment.

- (629) U.S. Environmental Protection Agency. "Economic Incentive Program Rules (Proposed Rule)." 58 FR 11110, February 23, 1993.

This action proposes rules for economic incentive programs (EIPs) which either may or must be adopted by States for certain ozone (O₃) and carbon monoxide (CO) nonattainment areas upon the failure of a State to submit an adequate plan showing that an applicable reasonable further progress (RFP) or a specific emissions reductions milestone has been met (in serious, severe, and extreme O₃ and serious CO nonattainment areas), or upon the failure of a serious CO nonattainment area to attain the National Ambient Air Quality Standards (NAAQS) for CO. This document is available from EPA's bulletin board system, file name=ecominc.zip.

- (630) U.S. Environmental Protection Agency. "Regulation of Fuels and Fuel Additives: Standards for Reformulated Gasoline; Proposed Rule (NPRM)." 58 FR 11722, February 26, 1993.

This notice proposes revisions to the simple model and the contents of a complex model to be used in the certification of reformulated gasoline, and associated procedures to assure compliance with the reformulated gasoline and anti-dumping programs. This notice additionally proposes "Phase II" reformulated gasoline emission performance standards which will take effect in the year 2000. See also the April 1, 1993 correction notice.

- (631) U.S. Environmental Protection Agency. "Control of Air Pollution from New and In-Use Motor Vehicles and New and In-Use Motor Vehicle Engines; Technical

Amendments to the Test Procedures for Methanol-Fueled Motor Vehicles and Motor Vehicle Engines and Petroleum-Fueled Motor Vehicles (Proposed Rule)." 58 FR 11816, March 1, 1993.

These revisions make minor corrections to the previously published procedures, provide additional options, and clarify the Agency's regulatory intent.

- (632) U.S. Environmental Protection Agency. "National Ambient Air Quality Standards for Ozone - Final Decision." 58 FR 13008, March 9, 1993.

In accordance with sections 108 and 109 of the Clean Air Act, the EPA announced on August 10, 1992 its proposed decision under section 109(d)(1) that revisions of the National Ambient Air Quality Standards (NAAQS) for ozone (O₃) are not appropriate at this time. This document announces the EPA's final decision under section 109(d)(1) that revisions of the primary and secondary standards are not appropriate at this time. Since publication of the August 10, 1992 notice, the EPA has initiated action to update the air quality criteria upon which this decision is based so that the recent information on health and welfare effects of O₃ can be considered as rapidly as possible in the next criteria and standards review.

- (633) U.S. Environmental Protection Agency. "Employee Commute Options (ECO) Guidance (Availability Notice)." 58 FR 13596, March 12, 1993.

The *Federal Register* notice gives information on obtaining the guidance document. The document may also be downloaded from the EPA bulletin board.

- (634) U.S. Environmental Protection Agency. "Volatility Regulations for Gasoline and Alcohol Blends (Final Rule)." 58 FR 14476, March 17, 1993.

This rule revises the March 1989 and June 1990 gasoline and alcohol volatility regulations. The revisions include changes to the liability provisions, including amendments to the defenses to liability, the addition of a test exemption section to allow the use of high volatility gasoline during the control period for research or emissions certification, and changes to sampling procedures and tests for determining RVP. See the April 12, 1993 corrections. See also the December 12, 1991 volatility regulations.

- (635) U.S. Environmental Protection Agency. "Retrofit/Rebuild Requirements for 1993 and Earlier Model Year Urban Buses; Fuel Quality Regulations for Certification Diesel Test Fuel (Final Rule)." 58 FR 21359, April 21, 1993.

The program affects 1993 and earlier model year urban buses whose engines are rebuilt or replaced after January 1, 1995. The program is limited to urban buses operating in metropolitan areas with 1980 populations of 750,000 or more. Concerns PM emissions.

- (636) U.S. Environmental Protection Agency. "National Ambient Air Quality Secondary Standard for Sulfur Oxides (Sulfur Dioxide)--Final Decision." 58 FR 21351, April 21, 1993.

The primary standard for SO₂ is 0.14 ppm, averaged over a 24-hour period and not to be exceeded more than once per year. The secondary standard is 0.5 ppm, averaged over a period of 3 hours and not to be exceeded more than once per year. EPA's final decision is not to change the current standards.

- (637) U.S. Environmental Protection Agency. "Final Approval of Colorado's Petition to Relax the Federal Reid Vapor Pressure Volatility Standard for Colorado in 1992 and 1993 (Final Rule)." 58 FR 26067, April 30, 1993.

This revision relaxes the RVP from 7.8 psi to 9.0 psi until 1994 for the Denver-Boulder ozone nonattainment area.

- (639) U.S. Environmental Protection Agency. "Prevention of Significant Deterioration For Particulate Matter (Final Rule)." 58 FR 31622, June 3, 1993.

The EPA is revising the maximum allowable increases (increments) for particulate matter (PM) under the requirements for prevention of significant deterioration (PSD) of air quality in 40 CFR 51.166 and 40 CFR 52.21. The revised increments are based on an indicator that focuses on particles with an aerodynamic diameter of less than or equal to a nominal 10 micrometers (PM-10), and will replace the original statutory increments for PM based on total suspended particulate (TSP) 1 year from today.

- (640) U.S. Environmental Protection Agency. "Clean Fuel Fleet Emission Standards, Conversions, and General Provisions and Amended Heavy-Duty Averaging, Banking, and Trading Credit Accounting Regulations (NPRM)." 58 FR 32474, June 10, 1993.

The CAAA require the establishment of a Clean Fuel Fleet Program. Under this program, a percentage of the new vehicles acquired by certain fleet owners located in covered areas will be required to meet clean-fuel fleet vehicle (CFFV) emission standards. This requirement can be met by the purchase of new CFFVs, the conversion of conventional vehicles to CFFVs, or through purchases of credits pursuant to a credit program. Affected states will be required to revise the SIPs to incorporate the fleet program, including provisions to implement a credit program and exempt CFFVs from certain TCMs.

- (641) U.S. Environmental Protection Agency. "Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: Evaporative Emission Regulations for Gasoline- and Methanol-Fueled Light-Duty Vehicles and Light-Duty Trucks and Heavy-Duty Vehicles; Corrections (Final Rule; Technical Correction)." 58 FR 34535, June 28, 1993.

This article provides corrections to the EPA's new (March 24, 1993) test

procedure to measure evaporative emissions from motor vehicles.

- (642) U.S. Environmental Protection Agency. "Requirements for Preparation, Adoption, and Submittal of Implementation Plans (Final Rule)." 58 FR 38816, July 20, 1993.

EPA's *Guideline on Air Quality Models (Revised)* sets forth air quality models and guidance for estimating ambient air concentrations due to sources of air pollutants. This rulemaking adds new or updated models to those listed in the Guideline document. In addition, this rule amends the CFR to incorporate supplement B as codified text, as well as giving regulatory status to long-standing EPA policy regarding the use of air quality models for other regulatory programs.

- (643) U.S. Environmental Protection Agency. "Application Sequence for Clean Air Act Section 179 Sanctions (NPRM)." 58 FR 51270, October 1, 1993.

The proposed rule affects the order that sanctions will be applied under section 179. EPA is proposing that offset sanctions apply 18 months after the date EPA makes a finding, and that highway sanctions apply 6 months after application of the offset sanction. If this rule is adopted, the sanctions would automatically apply in this prescribed sequence for current and future EPA findings of failure to comply. This is the general sequence that EPA has already been using, but they want to make it a rule in order to give the public a chance to comment on it.

- (644) U.S. Environmental Protection Agency. "Approval and Promulgation of Air Quality Implementation Plans; Texas; Revision to the State Implementation Plan Addressing PM-10 for El Paso (Propose Rule)." 58 FR 52467, October 8, 1993.

This action proposes approval of a revision to the Texas PM-10 State Implementation Plan (SIP) for El Paso, Texas. PM-10 is defined as particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers. The EPA is also proposing to approve the PM-10 SIP for El Paso, Texas, as meeting the requirements of section 179B of the Clean Air Act (CAA) regarding implementation plans and revisions for international border areas.

- (645) U.S. Environmental Protection Agency. "Clean Air Act Approval and Promulgation of Title I, Section 182(d)(1)(B), Employee Commute Options/Employer Trip Reduction Program for Texas (Proposed Rule)." 58 FR 53693, October 18, 1993.

EPA proposes to approve Texas' SIP revision establishing an Employee Commute Options/Employer Trip Reduction program in the Houston-Galveston-Brazoria nonattainment area. The SIP revision was submitted to satisfy the statutory mandate that an ECO/ETR program be established for employers with 100 or more employees, such that compliance plans developed by such employers are designed to convincingly demonstrate an increase in the

average passenger occupancy (AVO) of their employees who commute to work during the peak period, by no less than 25 percent above the average vehicle occupancy (AVO) of the nonattainment area.

- (648) U.S. Environmental Protection Agency. "Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved Under Title 23 U.S.C. or the Federal Transit Act (Final Rule)." 58 FR 62188, November 24, 1993.

This is the final transportation conformity rule which requires that transportation plans, TIPs, and projects conform to the goals of the State Implementation Plan for air quality. The rule only applies to nonattainment areas and went into effect on December 27, 1993.

- (649) U.S. Environmental Protection Agency. "Clean Fuel Fleet Program Definitions and General Provisions (Final Rule)." 58 FR 64680, December 9, 1993.

The provisions of Subpart C of Title II of the CAA require certain states to revise their SIPs to incorporate a Clean Fuel Fleet Program. Under this program, specified percentages of the new vehicles acquired in model year 1998 and after by certain fleet owners must meet clean-fuel fleet vehicle (CFFV) emission standards. This requirement can be met by the purchase of new CFFVs, the conversion of conventional vehicles to CFFVs, or through purchase of credits pursuant to a credit program. The revised SIPs for affected states must also include provisions to implement a credit program and to exempt CFFVs from certain transportation control measures. These revisions must be submitted to EPA by May 15, 1994.

This final rule contains definitions for certain key terms and provisions, for use by states in determining the requirements of their programs. These terms and provisions will be used to determine which fleet operators are covered by the requirements of the program and to determine which fleet vehicles will be counted for the purchase requirements of the program.

- (650) U.S. Environmental Protection Agency. "Designation of Areas for Air Quality Planning Purposes (Final Rule)." 58 FR 67334, December 21, 1993.

The EPA, in accordance with section 107(d)(3) of the Clean Air Act, is redesignating areas as nonattainment for PM-10 and sulfur dioxide national ambient air quality standards (NAAQS) due to violations of these standards. The EPA will require states with such nonattainment areas to develop and expedite plans to bring these areas into accordance with the NAAQS for both pollutants.

- (651) U.S. Environmental Protection Agency. "State Implementation Plans for Lead Nonattainment Areas; Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990 (Proposed Rule)." 58 FR 67748, December 22, 1993.

This notice replaces the draft version that was issued July 8, 1992. The lead addendum provides detailed guidance on meeting the requirements for reasonably available control measures (RACM), reasonably available control technology (RACT), reasonable further progress (RFP) for lead, and contingency measures. In general, this guidance parallels existing guidance previously issued for other pollutants, such as PM-10 and SO₂.

- (652) U.S. Environmental Protection Agency. "Regulation of Fuels and Fuel Additives: Renewable Oxygenate Requirements for Reformulated Gasoline (Proposed Rule)." 58 FR 68343, December 27, 1993.

This rule proposes a program to maximize energy and other benefits from reformulated gasoline programs while obtaining significant reductions in VOCs and toxic air pollutants. The program requires that 30 percent of the oxygen content of reformulated gasoline come from renewable oxygenates. As a result, the program would reduce foreign oil imports, fossil energy use, and harmful greenhouse gasses. This rule also contains proposed enforcement actions relative to the program.

- (653) U.S. Environmental Protection Agency. "Revisions to Corporate Average Fuel Economy (CAFE) Calculations Pursuant to the North American Free Trade Agreement Implementation Act of 1993 (Final Rule)." 59 FR 677, January 6, 1994.

This rule details changes to the Corporate Average Fuel Economy (CAFE) calculation regulations to incorporate changes required by section 371 of the North American Free Trade Agreement Implementation Act of 1993.

- (654) U.S. Environmental Protection Agency. "Criteria for Exercising Discretionary Sanctions Under Title I of the Clean Air Act (Final Rule)." 59 FR 1476, January 11, 1994.

This rulemaking sets forth criteria that EPA must consider when exercising its discretionary authority to impose sanctions on a statewide basis pursuant to the CAAA. If EPA makes one of the findings of SIP deficiency described in the Act, EPA may impose an emissions offset or highway funding sanction on any portion of the State that the Administrator determines is reasonable and appropriate for the purpose of ensuring that the requirements of the Act relating to plans are met. This rulemaking establishes the criteria EPA shall use in exercising its discretionary authority during the 24-month period following a finding of a plan deficiency to ensure that these sanctions are not applied on a statewide basis when one or more political subdivisions are principally responsible for such deficiency. In addition, EPA describes the discretionary sanctions provision and EPA's anticipated application of these sanctions "at any time" after the Agency makes a finding. This rule becomes effective February 10, 1994.

- (655) U.S. Environmental Protection Agency. "Imposition of Statewide Sanctions on California under Clean Air Act Section 110(m) for Failure to Submit a Complete SIP Revision for an Enhanced Motor Vehicle Inspection and Maintenance Program (NPRM)." 59 FR 3534, January 24, 1994.

EPA is proposing to impose discretionary sanctions on California because the State Legislature did not enact the required legislation providing authority for implementing an enhanced I/M program by November 1993. In December 1993, California submitted a SIP revision which was found to be incomplete by the Region 9 EPA office. Due to the failure of the State to submit a complete SIP revision fulfilling either the requirements of the Act or its commitment to adopt and implement an enhanced I/M program as promised in its committal SIP, EPA proposes to exercise its discretionary authority under the Act to apply a statewide highway funding limitation sanction and a 2 for 1 offset sanction in all areas required to have a permit program under the new source review provisions of the Act.

- (656) U.S. Environmental Protection Agency. "Approval and Promulgation of Air Quality Implementation Plans; Texas; Revision to the State Implementation Plan (SIP) Addressing Carbon Monoxide (CO) for El Paso (NPRM)." 59 FR 15683, April 4, 1994.

This action approves a revision to the Texas SIP concerning CO for El Paso.

- (657) U.S. Environmental Protection Agency. "Approval of Colorado's Petition to Relax the Federal Reid Vapor Pressure Volatility Standard for Colorado in 1994 and 1995 (Final Rule)." 59 FR 15629, April 4, 1994.

This rule approves Colorado's petition to relax the Reid Vapor Pressure applicable to gasoline introduced into commerce in the Denver-Boulder ozone nonattainment area from June 1 to September 15 from 7.8 pounds per square inch to 9.0 psi.

- (658) U.S. Environmental Protection Agency. "Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Refueling Emission Regulations for Light-Duty Vehicles and Light-Duty Trucks (Final Rule)." 59 FR 16262, April 6, 1994.

This document contains EPA's final rule implementing the control of vehicle refueling emissions through the use of vehicle-based systems. The rule applies to all fuels used by a vehicle, and includes special provisions for vehicles/fuels judged to be inherently low in refueling emissions. For light-duty vehicles (LDVs), the requirements begin in the 1998 model year, and phase in over three model years. For the 1998 model year, 40 percent of each manufacturer's LDVs must meet the requirements. This increases to 80 percent in the 1999 model year and rises to 100 percent in model years 2000 and later. A

special provision for phase-in is also included for small volume manufacturers of light-duty vehicles.

This requirement also applies to light-duty trucks (LDTs). For LDTs with a gross vehicle weight rating (GVW) of 0-6000 lbs., the requirement begins in model year 2001 and phases in over three model years at the same rate as applied to LDVs. For LDVs with a GVW of 6001-8500 lbs., the requirement begins with model year 2004 and phases in over three model years at the same rate as LDVs. This rule does not apply to heavy-duty vehicles.

This rule also covers certification requirements for control system designs and enforcement provisions.

- (659) U.S. Environmental Protection Agency. "Economic Incentive Program Rules (Final Rule and Guidance)." 59 FR 16690, April 7, 1994.

This action promulgates rules for economic incentive programs (EIPs) which either may or must be adopted by States for certain ozone and carbon monoxide nonattainment areas upon the failure of a State to submit an adequate showing that an applicable reasonable further progress (RFP) or a specific emissions reductions milestone has been met (in serious and above O₃ areas, and in serious CO areas) or upon the failure of a serious CO nonattainment area to attain the NAAQS for CO. Under the CAAA, the EPA was required to promulgate final EIP rules for stationary, area, and mobile sources by November 15, 1992. This rulemaking is that action.

This rule also provides guidance for discretionary EIPs that any State may choose to adopt for any criteria pollutants. The portion of this rule that concerns discretionary EIPs is intended as guidance, not final action. Final action will occur when EPA approves or disapproves SIP revisions concerning discretionary EIPs.

- (660) U.S. Environmental Protection Agency. "Approval and Promulgation of Implementation Plan Texas Stage II Program (Final Rule)." 59 FR 17940, April 15, 1994.

This notice publishes EPA's approval of the Texas SIP revision to implement a Stage II vehicle refueling emissions reduction program. The Texas Stage II program requires owners and operators of gasoline dispensing facilities to install and operate Stage II vapor recovery equipment in the four Texas ozone nonattainment areas classified as moderate or worse.

- (661) U.S. Environmental Protection Agency. "Regulations Governing Awards Under Section 113(f) of the Clean Air Act (NPRM)." 59 FR 22795, May 3, 1994.

This rule provides criteria and procedures for granting awards by amendment to the Clean Air Act which directs the EPA at its discretion to pay awards, not to exceed \$10,000, to persons who provide information which lead to criminal convictions under section 113 of the Act for a violation of titles I, III, IV,

V, or VI of the Act.

- (662) U.S. Environmental Protection Agency. "State Implementation Plan Processing Reform (PC)." 59 FR 24054, May 10, 1994.

This action discusses changes being implemented for handling direct final State implementation plan (SIP) actions.

- (663) U.S. Environmental Protection Agency. "Approval and Promulgation of Air Quality Implementation Plans; Texas; Revision to the State Implementation Plan Vehicle Inspection and Maintenance Programs (PR)." 59 FR 24867, May 18, 1994.

This action proposes to approve the Texas Natural Resource Conservation Commission Inspection and Maintenance State Implementation Plan.

- (664) U.S. Environmental Protection Agency. "Air Pollution Control; Preemption of State Regulation for Nonroad Engine and Vehicle Standards (Final Rule)." 59 FR 36969, July 20, 1994.

This final rule outlines the requirements and procedures relating to the control of emissions from new nonroad vehicles or engines under section 209(e) of the CAAA, as amended.

- (665) U.S. Environmental Protection Agency. "Conditional Approval and Promulgation of Section 182(f) Exemption to the Nitrogen Oxides (NO_x) Control Requirements for the Dallas-Fort Worth and El Paso Ozone Nonattainment Areas; Texas (Final Rule)." 59 FR 60709, November 28, 1994.

EPA approved Texas's request for exemptions because Dallas-Fort Worth was able to show ozone attainment without additional NO_x controls and El Paso was able to show ozone attainment without additional NO_x controls with the exception of emissions from Mexico. Effective date of the exemption is November 21, 1994.

- (666) U.S. Environmental Protection Agency, Office of Air and Radiation. *Outreach and Communications Resources*. Washington, D.C.: U.S. Environmental Protection Agency, July 1993.

A listing of written materials and information contacts for the general public (e.g., they don't list specific materials to do emission inventories, etc.).

- (667) U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *Coding Manual for AMS-PC*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 1991.

AIRS is a computer-based system administered by the EPA and is used for handling the storage and retrieval of information pertaining to airborne pollutants. AIRS is installed on an IBM mainframe at EPA's National Computer Center in

Research Triangle Park, N.C. The AIRS Area and Mobile Source Subsystem (AMS) is that component of AIRS which supports inventories for point sources too small to track individually, other area sources, and mobile sources. This manual describes the data elements used in the PC version of the AMS (AMS-PC). Information on the availability and current version of the software may be obtained by contacting EPA's National Air Data Branch at (919) 541-5687. In addition to this manual, a user's guide and a software installation guide are also available.

(668) U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *AIRS Area & Mobile Source Category Codes*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, May 1993.

(669) U.S. Environmental Protection Agency, Office of Mobile Sources. "Preliminary Electric Vehicle Emissions Assessment (draft)." n.p., November 3, 1993.

EPA has released this draft paper for review and comment. The paper presents a preliminary assessment developed by EPA staff to identify a methodology for assessing lifecycle emissions from electric vehicles.

(670) U.S. Environmental Protection Agency, Office of Mobile Sources. *Supplemental Guidance for I/M Programs: Performance Monitoring (draft)*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, December 1, 1993.

This document provides guidance for I/M performance monitoring, as required in 40 CFR Section 51.369(b). Enhanced I/M areas must have a performance monitoring program by January 1, 1995. Basic I/M areas are not required to have a performance monitoring program, but EPA recommends one for these areas as well. The oversight agency in an enhanced I/M area is required to do the following: (1) provide the public a summary of the performance of local repair facilities, (2) provide feedback to the individual repair facilities, and (3) require a completed repair form as a prerequisite for a retest.

The information in this document will be incorporated into a revision of the draft March 24, 1993 OMS document titled, "Supplemental Guidance for I/M Programs: Vehicle Repair, Technician Training and Certification, and Repair Shop Tracking."

(671) *User's Guide for the Mobile Source Data Converter*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 5, 1992.

The Mobile Source Data Converter is a macro-coded spreadsheet that requires the user to input certain data (e.g., geographical identification, VMT, emission factors), processes this data to create the appropriate input fields for the AMS transaction file, and then writes the transaction file. This transaction file can then be uploaded to the AMS mainframe and used to update the inventory for the nonattainment area specified.

- (672) *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, November 1992. Report number: EPA-454/R-92-006; NTIS no. Pb93-210250LEU (\$19.50).

CAL3QHC is a microcomputer based model to predict carbon monoxide or other inert pollutant concentrations from motor vehicles at roadway intersections. The model includes the CALINE3 line source dispersion model and a traffic algorithm for estimating vehicular queue lengths at signalized intersections. CAL3QHC enhances CALINE3 by incorporating methods for estimating queue lengths and the contribution of emissions from idling vehicles. The model permits the estimation of total air pollution concentrations from both moving and idling vehicles. It is a reliable tool for prediction concentrations of inert air pollutants near signalized intersections. Because idle emissions account for a substantial portion of the total emissions at an intersection, the model is relatively insensitive to traffic speed, a parameter difficult to predict with a high degree of accuracy on congested urban roadways without a substantial data collection effort.

- (673) *User's Guide to MOBILE4 (Mobile Source Emission Factor Model)*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, February 1989. Report number: EPA-AA-TEB-89-01.

MOBILE estimates emission factors for hydrocarbon, carbon monoxide, and nitrogen oxide emissions from vehicles. The calculations used are presented in the EPA document titled, *Compilation of Air Pollutant Emission Factors - Volume II: Highway Mobile Sources*.

See the newer user's guides for versions 4.1, 5, and 5a.

- (674) *User's Guide to MOBILE4.1 (Mobile Source Emission Factor Model)*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, July 1991. Report number: EPA-AA-TEB-91-01.

MOBILE estimates emission factors for hydrocarbon, carbon monoxide, and nitrogen oxide emissions from vehicles. The calculations used are presented in the EPA document titled, *Compilation of Air Pollutant Emission Factors - Volume II: Highway Mobile Sources*.

MOBILE calculates emission factors for eight vehicle types and for either high or low altitude. MOBILE's estimates depend on inputs such as ambient temperature, speed, mileage accrual rates, and others.

See the updated versions of Chapter 2 for MOBILE5 and MOBILE5a.

- (675) *User's Guide to MOBILE5 (Mobile Source Emission Factor Model)*. Ann Arbor, Mich.: U.S. Environmental Protection Agency, May 1994. Report number: EPA-AA-AQAB-94-01.

Revised user's guide that includes six chapters. Replaces the Chapter 2

revisions for MOBILE5 and 5a that were released earlier.

- (676) *User's Guide to the PC Version of the Direct Travel Impact Model*. Sacramento, Calif.: Distributed by the Office of Traffic Improvement, California Department of Transportation, October 1, 1992.

The purpose of this User's Guide is to provide PC-DTIM users with information and guidelines to produce successful mobile source emission estimates. Specifically, for developing emission estimates that are linked to travel demand forecasting.

- (678) Wade, Montie G., Dennis L. Christiansen and Daniel E. Morris. *An Evaluation of the Houston High-Occupancy Vehicle Lane System*. College Station, Tex.: Texas Transportation Institute, Texas A&M University System, August 1992. Report number: Research Report 1146-5; FHWA/TX-89/3-1146-5.

- (680) Walsh, Michael P. "Motor Vehicles and Fuels: The Problem." *EPA Journal* 17, 1 (January 1991): 12-14.

The author discusses two decades of research about vehicle emissions and fuels and how it provided a congressional framework for changes in the 1990 CAAA.

- (681) Wang, Quanlu, Catherine Kling and Daniel Sperling. "Light-Duty Vehicle Exhaust Estimates Using a Part-Pricing Approach." *Air & Waste* 43, 11 (November 1993): 1461-1471.

- (682) Wang, Quanlu and Danilo L. Santini. "Magnitude and Value of Electric Vehicle Emissions Reductions for Six Driving Cycles in Four U.S. Cities with Varying Air Quality Problems." *Transportation Research Record*, 1416 (October 1993): 33-42.

- (683) Washington, Simon, Randall Guensler and Daniel Sperling. "Emission Impacts of Intelligent Vehicle Highway Systems." In *Transportation Planning and Air Quality II*, edited by Wholley, Thomas F., 118-139. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.

- (684) *Washington State Freeway HOV System Policy: Executive Summary*. Olympia, Wash.: Washington State Department of Transportation, November 1992.

- (686) Watson, Ann Y., Richard R. Bates and Donald Kennedy, eds. *Emission Inventory Issues: Proceedings of an International Specialty Conference*. Pittsburgh: Air & Waste Management Association, 1993.

These proceedings from a conference held October 19-22, 1992, in Durham, N.C., contain many papers, many of them dealing with mobile source

emissions.

- (687) Wayson, Roger L., ed. *Transportation Planning and Air Quality: Proceedings of the National Conference*. Santa Barbara, Calif., July 28, 1991. New York: American Society of Civil Engineers, 1992.

These proceedings contain papers and presentations on transportation and air quality planning requirements of the Clean Air Act, the effectiveness of implemented transportation strategies, interfacing transportation and emissions models, tools for evaluating Transportation Control Measures, trends in mobile source emissions modeling, intersection air quality modeling, and innovative approaches to transportation and emissions control.

- (688) Weisel, Clifford P., Nicholas J. Lawryk, Alan H. Huber and Gennaro H. Crescenti. "Gasoline and Methanol Exposures from Automobiles within Residences and Attached Garages." Research Triangle Park, N.C.: U.S. Environmental Protection Agency, 1993.

A pilot study was conducted to evaluate the characteristics of the air concentrations within a garage microenvironment. The air exchange rate between the garage and the house, the windspeed in front of the garage door, the fuel tank temperature, and the air concentrations of benzene (from gasoline) and methanol (from M100 fuel) were measured after an automobile containing U.S. summer grade gasoline or a fabricated fuel tank containing M100 fuel entered the garage and its door was closed. The air concentrations in the garage were greatly elevated after the car or M100 fuel tank entered the garage compared to the ambient levels which were present prior to the car's entry. A steady state concentration was often reached within 90 minutes of the automobile or fuel tank entering the garage, and the air concentration remained level until the fuel tank temperature returned to ambient levels several hours later. The maximum concentration obtained was a function of the fuel tank temperature. These studies indicate that parking an automobile in residential garages results in increased exposures to persons spending time within the home and in the garage microenvironment.

- (689) Weissman, Steve and Judy Corbett. *Land Use Strategies for More Livable Places*. Sacramento, Calif.: California Air Resources Board, May 1992.

- (690) West, Kelly. "Houston HOV Users: How They Use and View HOVs." College Station, Tex.: Texas Transportation Institute, Texas A&M University System, August 1992. Report number: Summary Report 484-14S.

- (691) West, Kelly. "Evaluating the Performance of Freeway HOV Facilities in North America." College Station, Tex.: Texas Transportation Institute, Texas A&M University System, August 1992. Report number: Summary Report 925-2S.

- (693) "What Will Drive Our Driving in the Future? Excerpts from an Interview with John Heywood." *Transportation (MIT)* (June 1992): 4.
- (694) *What You Can Do to Reduce Air Pollution*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, October 1992.
- (695) Whiteman, Lily. "Trades to Remember: The Lead Phasedown." *EPA Journal* (May 1992): 38-39.
- (696) Wholley, Thomas F., ed. *Transportation Planning and Air Quality II*. Danvers, Mass., May 24, 1993. New York: American Society of Civil Engineers, 1994.
These proceedings contain papers on conformity, Transportation Control Measures, travel demand modeling, emissions modeling, and IVHS technologies.
- (697) Williams, Linda S. and Patricia S. Hu. *Light-Duty Vehicle Summary: Model Year 1976 to the First Half of Model Year 1989*. Oak Ridge, Tenn.: Oak Ridge National Laboratory, August 1989.
- (700) Wolfe, Paris R. "Pollution Credits for Sale: Is Cash-for-Clunkers Concept a Clunker?" *Recycling Today (Scrap Mkt. ed.)* (May 1992): 22-23.
This article critiques the EPA's pollution credit program, Cash-for-Clunkers program, to get older, high polluting cars off the road.
- (701) Wolff, George T. "On a NO_x-Focused Control Strategy to Reduce O₃." *Air & Waste* 43 (December 1993): 1593-1596.
In some instances, NO_x reductions can increase O₃. The author examines existing VOC/NO_x data and the results of the air-quality models referred to in the National Research Council report, "Rethinking the Ozone Problem in Urban and Regional Air Pollution."
- (702) *WSDOT Puget Sound Freeway HOV Program: Status Report and Implementation Options*. Seattle, Wash.: Washington State Department of Transportation, January 1993.
- (703) Yarwood, Greg, H. Andrew Gray, Mary P. Ligocki and Gary Z. Whitten. *Evaluation of Ambient Species Profiles, Ambient versus Modeled NMHC:NO_x and CO:NO_x Ratios, and Source-Receptor Analyses (Final Report)*. Research Triangle Park, N.C.: U.S. Environmental Protection Agency, September 1994. Report number: SYSAPP94/081.
This report evaluates 25 receptor modeling, source fingerprint, ambient ratio, and mass balance studies to determine whether they identify a shortfall in emissions as estimated using current emission inventory methodologies. The report notes that studies consistently show a low gasoline vapor contribution to

emission inventories and a discrepancy between ambient and inventory whole gasoline. However, the uncertainties in the analyses make it difficult to conclude that mobile sources are, in general, either over- or under-estimated as a fraction of the total hydrocarbon inventory.

(704) Yotter, Edward E. and Robert C. Effa. "California Air Resources Board's Motor Vehicle Emission Inventory Improvement Effort." In *Emission Inventory Issues: Proceedings of an International Specialty Conference*, 234-249. Durham, N.C., October 19, 1992. Pittsburgh: Air & Waste Management Association, 1993.

(705) Yuhnke, Robert E. "Clean Air in Our Times? The Amendments to Reform Transportation Planning in the Clean Air Amendments of 1990." Paper presented to TRB Legal Workshop in Snowbird, Utah, July 23, 1991.

This paper discusses why the 1970 CAAA act failed to affect transportation planning at the metropolitan level and how the 1990 CAAA addresses these failures. Specifically, the failure to reduce vehicle emissions through tighter tailpipe standards. The author feels that clean air in our cities will not occur until the "use of autos to meet personal mobility needs in the urban environment is dramatically changed." The 1990 CAAA reforms transportation planning by providing air quality criteria for the creation of metropolitan transportation plans. The 1990 CAAA clarifies transportation requirements for State air quality plans, shifts federal funding to encourage alternatives to reduce vehicle use, and encourages employer-based transportation programs in some areas.

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