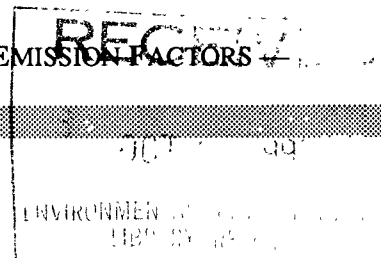




THE CHIEF NEWSLETTER

— THE CLEARINGHOUSE FOR INVENTORIES AND EMISSION FACTORS

3 DAYS ONLY



INTERNATIONAL CONFERENCE ON

THE EMISSION INVENTORY: PERCEPTION AND REALITY

The third annual specialty meeting on THE EMISSION INVENTORY: PERCEPTION AND REALITY, jointly sponsored by the California Air Resources Board (CARB) and the Air & Waste Management Association (AWMA), with coordination and support from EPA, will take place October 18-20 in Pasadena, CA. There will be 90 papers presented in 15 sessions, and a further 14 papers particular to individualized discussions have been chosen for a special poster session. Papers are due to the Technical Program Committee by September 17. This meeting follows, in

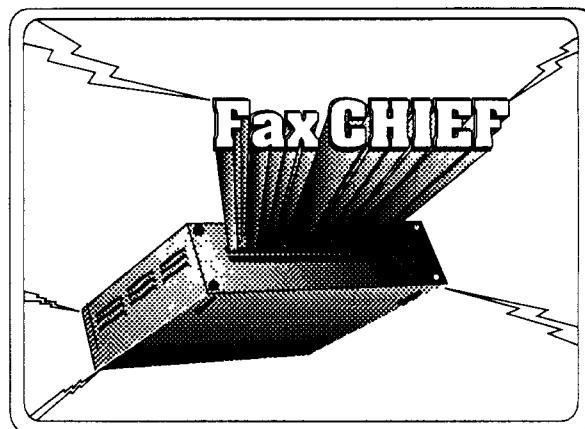
subject and focus, those held in 1991 and 1992 in Durham, NC. It is planned to continue these sessions annually, with a coastal rotation sequence to encourage broad participation. Attendance at each previous meeting exceeded 300.

General conference chairs are James D. Boyd of CARB and James M. Lents of the South Coast AQMD, and William Rogers Oliver of Radian Corporation heads the Technical Program Committee. Persons interested in exhibit booths should contact A. L. Wilson of IES Associates, Irvine CA, (714) 854-1167. ♣

FAX CHIEF IS ON LINE!

The Emission Inventory Branch's (EIB) newest service to the emission factor and inventory community, *Fax CHIEF*, is ready for business. This new tool, an "integrated facsimile/voice-response system", is a huge-capacity fax machine that can take your call, tell you how to key in the part(s) of a document you need, and then quickly fax back to you the requested material. At present, *Fax CHIEF* contains the entire stationary source volume of *Compilation Of Air Pollutant Emission Factors*, AP-42. Other documents, including AP-42 *Volume II: Mobile Sources* and other reports, will be available soon in this quick-response medium. Call (919) 541-5626/0548, the telephone numbers for *Fax CHIEF*, 24 hours per day, 7 days per week. All that's needed to use *Fax CHIEF* is any fax machine with an attached telephone. Dial one of the above numbers and follow the instructions you'll hear on keying your specific request. *Fax CHIEF* does the rest, quickly transmitting the material back to your facsimile device. Callers may get up to two items in a single call.

Give this new item a try. The only charges for using the service are those of your own machine, paper and telephone call. If you experience any difficulty trying to use *Fax CHIEF*, either call EIB's hotline, the *Info CHIEF*, at (919) 541-5285, or fax a note to us at (919) 541-0684. For other information, call *Info CHIEF*. ♣



 EMISSION INVENTORIES — THE KEY IN '93!



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UNITED NATIONS TASK FORCE ON EMISSION INVENTORIES

David Mobley recently attended the second meeting of the Task Force On Emission Inventories, which is sanctioned under the United Nation's Economic Commission For Europe. The Task Force met in Delft, The Netherlands on June 7-9 and was attended by 71 participants from 23 countries, involving numerous international organizations. The current focus of the Task Force is on producing an Emission Inventory Guidebook to help standardize emission estimation methods across the different countries. Contents of the Guidebook are being organized around the eight expert panels of the Task Force:

Strategic Overview

VOC Sources

Power Plants/Industry Sources

NH₃ Sources

Mobile Sources

Heavy Metals/Persistent Organic Compound Sources

Marine Sources

Verification Techniques

The Verification Panel, led by David Mobley, has a draft report available for review by interested parties, and a draft of the entire Guidebook should be available in several months. The next meeting of the Task Force is planned for June 1994 in Germany. For more information, contact Sherry Russell at the Newsletter, (919) 541-0875.

CORINAIR90 — AN EMISSION INVENTORY FOR EUROPE

The European Community is developing an emission inventory with a base year of 1990, which should provide for a useful comparison with the 1990 data for the United States and Canada. The inventory effort and its results will be known as the CORINAIR90 system, and will be part of the air component of *CORINE* - COoRdination d'INformation Environnementale. The CORINE program was begun in 1985 by the European Council Of Ministers, to gather, coordinate and ensure consistency of information on the environment and the natural resources of Europe.

The CORINAIR90 system has already obtained a large amount of emission data, which is now available to 30 countries, including the 12 members of the European Community, the Baltic states, Russia and other European nations.

CORINAIR90 has produced emission information on more than 260 types of source activity covering eight pollutants:

Sulfur dioxide (SO₂)

Carbon monoxide

Nitrogen oxides (NO_x)

Methane

Nonmethane volatile organic compounds (NMVOC)

Nitrous oxide

Ammonia

Carbon dioxide

The stated goal of CORINAIR90 is to provide a complete, consistent and transparent air pollutant emission inventory for Europe for 1990, within a reasonable time scale, to enable widespread use of the inventory for policy, research and other purposes. Data on the 1985 CORINAIR emission inventory were recently released.

For further information, contact Gordon McInnes, EEA-TF, Boulevard de Triomphe 174 (1/10), B1160 Brussels, Belgium (phone +322 296 8816, fax +322 296 9560); or Remy Bouscaren, CITEPA, Rue Henri Heine 3, 75016 Paris, France (phone +331 44 30 41 90, fax +331 45 27 31 32).

1987-1991 INTERIM REGIONAL EMISSION INVENTORIES

EIB and the Source Receptor Analysis Branch, in a cooperative effort, have completed development of the 1987-1991 Interim Regional Emission Inventories. These inventories, which were officially released in early June, contain county-level annual emission estimates for every county in the United States and three provinces of Canada. The data were developed from updated information where available, and from the 1985 NAPAP inventory projections where current data were not available. The data reside on EPA's National Computer Center mainframe and are thoroughly documented in *1987 - 1991 Interim Regional Emission Inventories, Volume I: Development Methodologies* and *Volume II: Emission Summaries* (EPA-454/R-93-021a and 021b).

It is planned to use these inventories, in conjunction with state-submitted AIRS data both in developing emission trends reports and with the Regional Oxidant Modeling (ROM) being performed to support State Implementation Plans. The current version of the interim inventories, Version 1, does not contain any state-specific data. We plan to update this inventory periodically with state data as those data become available in AIRS. Subsequent versions (2 and beyond) will reflect the incorporation of these data. Questions regarding either the development of these inventories or access to them should be directed to Steve Bromberg, at the Newsletter, (919) 541-1000, or to Chet Wayland of the Source Receptor Analysis Branch, (919) 541-4603.

FROM THE EFMS CHIEF'S CORNER

The Emission Factor & Methodologies Section (EFMS) has reached several new milestones since the last issue.

We hosted a 5-hour satellite training session to 17 locations on using the various aids in the CHIEF's "Tool Box". We also gave a course to 20 "students" from industry, consulting, and other sectors, in Denver at the Air And Waste Management Association meeting.

The newest item in the Tool Box is *Fax CHIEF*, another medium to give you the best information we can, in a timely and efficient manner. *Fax CHIEF* is a fax machine that you can telephone, tell what AP-42 parts you want, and have transmit the requested material quickly back to your own fax. See the article on *Fax CHIEF* elsewhere in the Newsletter.

Though delayed and a bit smaller than planned (51 revised or new parts), AP-42 *Supplement F* should be in print before the next issue of this Newsletter rolls around. We have also completed some new *Locating & Estimating* documents, and several more are in final review.

The more we get done, though, the more that seems to need to be done. Our "customer help" services continue to expand, but the demand always seems to increase faster. Last month alone, our CHIEF Bulletin Board, the *Info CHIEF* help line and other individual contacts with our staff totaled on the order of 2000. Some of these were pc inquiries and down loads, and some requested only an information brochure or the like, but many required significant staff response time. Our people often get swamped, and frequently, an individual out of the office for a day has 20-30 calls on her/his voice mail upon returning. I hope that you, instead of growing impatient if there's no response within the hour or the day, will research your inquiries, be specific when calling, and be patient while we work around to helping you. Our staff is generally very hardworking and sensitive, so if you'd help me

give them a pat on the back now and then to recognize what they are trying to do to help, I'd appreciate it. Thanks!

We do have some new faces here, albeit temporarily. **Joe Pinto**, an atmospheric chemist in the Atmospheric Research And Exposure Assessment Lab (AREAL), is on a rotation tour with EIB, and Joe is doing quality assurance (QA) and data analysis on the emission inventories we've received. He has worked on global methane inventories as well as air pollution problems in several foreign countries. Joe likes to apply his green thumb around the yard and to work in some sailing. **Bill Benjy**, another hand rotating with us, is a specialist in climatology and microclimates. He started with graduate field work in Alaska and served with several federal agencies before joining EPA. Here, he has coordinated, and sometimes compiled, emission inventories for regional dispersion models. Recently, Bill has focused on toxic and pesticide emissions. He also looks after his "mini-orchard" and is a *basso profundo* with a Durham choral society.

Also, two bright young students have been making their contributions here this summer. **Kim Melvin**, a recent graduate of Florida State in Mechanical Engineering, is enjoying her stay in North Carolina and does lots of running and other outdoor exertions. She also makes jewelry (beading). With EIB, Kim has shown a strong talent with sophisticated computer graphics and other accomplishments. She's now headed for her master's. **Ron Mattson**, a Michigan native pursuing a degree in Electrical Engineering at Michigan State, has been busy performing quality assurance on heaps of emission data for us. Off duty, he likes to play tennis, golf, billiards and pinball, and he's enjoying the night life in some of Raleigh's clubs.

We've been pleased to have Kim and Ron working with us, and we wish them much luck in the future. ♪

Jim Southerland

Chief, Emission Factor & Methodologies Section

EMISSION INVENTORY IMPROVEMENT PROGRAM

The Emission Inventory Improvement Program (EIIP) is a joint effort of the state and local control agencies (STAPPA/ALAPCO) and EPA to improve the process for collecting and reporting emission inventory data. The program offers an opportunity for all those individuals interested in emissions data to participate in developing and/or improving existing procedures for collecting these data.

These subject areas have been identified, and participation is solicited for committee memberships on these topics:

Point Source Methods

Area Source Methods

Mobile Source Methods

Biogenic Source Methods

Data Management

EPA/State/Local Interactions

Quality Assurance

For EIIP to be successful, it must have input from those with experience in the actual collection of emissions data. Participants working on the committees will have the singular opportunity to influence the various procedures related to emissions data collection that result from this program.

Anyone interested in becoming an active participant in the Emission Inventory Improvement Program should call Steve Bromberg at the Newsletter, (919) 541-1000, to receive more information on EIIP and on the Technical Subcommittee meeting planned for this October or November. ♪

CHIEF Bulletin Board Activities:

Results Of "Idea Week" — As many of you know from the last Newsletter, EIB held "Idea Week" June 7-14, sort of an open season for suggestions and comments, as a special opportunity for people in the EPA Regions, state and local agencies, and the private sector to voice their ideas on emission inventory issues. The most responses (48%) came from state agencies, 24% came from US EPA, 19% were from the private sector, 5% were from local agencies, and 2% of those responding chose to be anonymous. In summary, the comments fall into three areas of concern: AP-42 and Emission Factors, Inventory Development and Submission, and Information Systems. A good number of you responded to "Idea Week", but we need more input. We like hearing from you, and to get you started thinking, the BB now has an electronic "questionnaire", available in the "General News" submenu, under "News", in the "Factor And Inventory Info" section. Download the file, add your ideas and suggestions, and then E-mail, write or phone them to Michael Hamlin, CHIEF Bulletin Board Operator, here at the Newsletter, (919) 541-5232.

Areas where many commenters felt EIB was doing a notably good job were with the CHIEF Bulletin Board, XATEF, TANKS, and The CHIEF Newsletter. We are putting together a detailed discussion of the material we received and the actions we plan as a result, and we will distribute this report when it's done. We have already begun to respond to some of the "ideas" given to us.

Other Business — Be sure to read the article above on the new Fax CHIEF! BB use continues to be brisk, and more than 1100 registered CHIEF users have logged on over 6000 times since the last Newsletter. After checking the current "Alerts", remember to review the old ones to make sure you're up to date. Alerts stay current for at least a month before they are moved to the "old" list.

Emission Estimation Software — For states that must prepare PM-10 inventories, the PM-10 Controlled Emission Calculator is now available in the Emission Estimation Software section. This program will calculate an overall PM-10 control efficiency for up to two control devices operating in series on specific processes. It applies

the control efficiency to uncontrolled emissions to estimate emissions after controls. Installation instructions and a user's manual are available. The Calculator will be available on CHIEF until the equivalent functionality is incorporated into the AIRS Facility Subsystem.

The Area Source Analysis Program (ASAP) is another new addition to the Emission Estimation Software section. The program, and its accompanying technical report, present techniques for analyzing soil gas and soil samples to estimate air emissions from area sources.

MOBILE5 — A new program to assist in evaluating MOBILE4.1 and 5a input files is available in the Emission Estimation Software section, subsection MOBILE5. The MOBILE Input Data Analysis System (MIDAS) beta version evaluates the major parameters in the MOBILE model and identifies those variables that are inconsistent with EPA guidance. A user's manual is available.

As a way to "formalize" some of the guidance for using MOBILE5, a series of documents called MOBILE5 Information Sheets has been introduced. These info sheets, sequentially numbered, contain useful information and guidance for MOBILE5 users. The first info sheet and the introductory memo have been added to the BB in the Emission Estimation Software section, subsection MOBILE5. Additional sheets will be made available as they are produced. MOBILE5 information is available also on the Mobile Source board of the Technology Transfer Network that contains the CHIEF BB.

Final Locating & Estimating documents for styrene and methylene chloride are on the BB. Use the L&E submenu from the AP-42/EF Guidance menu to download these files. More L&Es are in the works.

The Document Ordering Module — Remember to use the BB module for quick ordering of any of the L&E series on toxic substances. You may access this module from the FACTOR and INVENTORY INFO section of the Main menu. Your requests will then go directly to our library services staff for distribution to you. For assistance with this, or to submit any comments on the module, call the Info CHIEF at the Newsletter, (919) 541-5285. ♪

EMISSION INVENTORY REVIEW PROGRAM

Here is a summary of 161 final Ozone and Carbon Monoxide (CO) emission inventories that have been received and reviewed by OAQPS:

- All Nonattainment Areas have submitted their inventory to EPA for review.
- All reviews by OAQPS have been returned to the Regional Offices (in either preliminary or final form).
- Of all those reviewed to date, no inventories have been recommended for approval.

OAQPS is available to assist the Regions and states with any corrections/revisions needed in their respective EIs to meet the 1990 Clean Air Act Amendment requirements. For more information, or for questions about assistance with inventories, contact Sharon Nizich at the Newsletter, (919) 541-2825. ♪

EMISSION INVENTORY DIRECT ASSISTANCE PROGRAM

The Emission Inventory Branch has received additional funding to support the Direct Assistance Program for Emission Inventory Preparation. This program was a huge success last year, but financial support ended before all states could take advantage of the service. States have been informed of the resumption of the assistance program, and it is well under way.

The assistance now available covers all facets of inventory preparation, from AIRS data upload to area source methodology. Funds are limited, so they will be directed to serious and ozone nonattainment areas and worse. For more information, please contact your Regional Office representative or Sharon Nizich at the Newsletter, (919) 541-2825. ♣

EIB PUBLISHES NEW HAZARDOUS SUBSTANCE REPORTS

The Branch is adding several new reports to its *Locating And Estimating* series on air toxic pollutants. The purpose of this report series is to help in locating potential sources of air toxics and then making preliminary estimates of emissions from these sources. Compounds and source category-specific reports currently being readied for publication include:

Methylene Chloride (EPA-454/R-93-006)	Methyl Ethyl Ketone
Styrene (EPA-454/R-93-011)	Chlorobenzenes (update)
Mercury	Toluene
Cadmium	Xylenes
Chloroform (update)	Dioxins/Furans
Cyanides	Medical Waste Incineration
Methyl Chloroform	

These reports contain available process descriptions, process variations and release points that may exist within these sources, as well as emission factors and emission data. Discussion of procedures for sampling and analyzing air toxic emissions from these sources is also provided. Drafts are on the *CHIEF* BB.

For a full list of topics covered in the *L&E . . .* series, you can get the EIB brochure *TOOLS: For Estimating Criteria And Toxic Air Pollutant Emissions*. This brochure also contains information about other air emissions estimation tools available from EIB. For more information, call the *Info CHIEF*, (919) 541-5285. ♣



THE CHIEF NEWSLETTER is produced quarterly by the Emission Inventory Branch, Technical Support Division, of EPA's Office Of Air Quality Planning And Standards. Its purpose is to enhance communication within the emission factor and inventory community by providing new and useful information and by allowing for the exchange of information between and among its readers. Comments on the Newsletter, and articles for inclusion in it, are welcome and should be directed to **Whitmel M. Joyner**, Editor, Emission Inventory Branch (MD 14), US EPA, Research Triangle Park, NC 27711; commercial phone (919) 541-5493.

The contents of *THE CHIEF* do not necessarily reflect the views and policies of the Agency, neither does the mention of trade names or commercial products constitute endorsement or recommendation for use. ♣

⑧ QUIZ CORNER ⑧

We're supposed to be big time tree huggers, yet not a peep has arisen about the Arbor Day quiz. Come on, you regulars. George, what happened? As professionals, surely we can't want the quizzes to get *easier*. Let's get cracking. **Hints:** Use AP-42, not AFSEF, because of recent changes in the factors. And where values are equal, give them the same rank (*i. e.*, 1.2, 1.2, 4.5 should be ranked 1, 1, 3).

A utility is considering adding a new unit, planning to choose from among the following fuel/boiler combos:

- | | |
|---|---|
| 1) Bituminous coal – pulverized dry bottom boiler | 2) Bituminous coal – pulverized wet bottom boiler |
| 3) Anthracite coal – stoker fired | 4) Lignite – spreader stoker |
| 5) Residual oil, Grade 4 | 6) Natural gas |

The fuels have these characteristics:

	Heating value	% Ash	% Sulfur
Bituminous coal	13K BTU/lb	12.0	3.0
Anthracite	12.3K BTU/lb	11.5	0.75
Lignite	7.2K BTU/lb	6.2	0.7
Residual oil, Grade 4	150K BTU/gal	0.075	2.25
Natural gas	1K BTU/SCF	—	—

Rank the options, *uncontrolled*, from lowest to highest, by lb/MM BTU, and tabulate thusly:

	Particulate	PM-10	SO ₂	NO _x	VOC	CO
Bituminous coal						
Anthracite						
Lignite						
Residual oil, Grade 4						
Natural gas						

- ①
②
③
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⑧
⑨

UPCOMING MEETINGS AND CONFERENCES

— South Atlantic Section Annual Meeting, AWMA, emphasizing toxics management, 23-24 September, Charlotte, NC. Contact Cathy Taylor, (804) 281-3745.

— Emission Inventory Training Sessions, 27-29 September, Various satellite downlink locations. Registration, contact Betty Abramson, Air Pollution Training Institute, US EPA, MD 17, Research Triangle Park, NC 27711; Information: Mary Ann Warner-Selph at the Newsletter, (919) 541-1192

— International Symposium On Optical Sensing For Environmental Monitoring, 11-14 October, Atlanta, GA. Contact Gretchen Watson, AWMA, Box 2861, Pittsburgh, PA 15230, (412) 232-3444.

— CONEC '93, Conference On Environmental Commerce And Trade Show, 17-20 October, Chattanooga, TN. Contact Charles Waggoner, Box 1146, Chattanooga, TN 37401; (615) 265-5269

— AWMA Specialty Conference, "The Emission Inventory: Perception And Reality", 18-20 October, Pasadena, CA. Contact Patricia Velasco, CA Air Resources Board, Box 2815, Sacramento, CA 95812, or Kathy Hsiao, South Coast AQMD, 21865 E Copley, Diamond Bar, CA 91765

— Regional Photochemical Measurement And Modeling Studies, 7-12 November, San Diego, CA. Contact AWMA, Box 2861, Pittsburgh, PA 15230, (412) 232-3444

— 1994 EPA/AWMA Title III Workshop Series: MACT Standards, HON Rule, Toxics Permitting, Residual Risk, Monitoring, Interface with other Sections of the Act, &c. 13-14 Jan, San Francisco, 24-25 Feb, Baton Rouge; 17-18 Mar, Houston; 7-8 Apr, Charlotte; 28-29 Apr, Newark; 19-20 May, Chicago. Contact Court Gould, AWMA, Box 2861, Pittsburgh, PA 15230, (412) 232-3444. ♣

Special Report —

**AIR AND ENERGY ENGINEERING RESEARCH LABORATORY
(AEERL)**

— EMISSIONS AND MODELING BRANCH RESEARCH UPDATE —

INTRODUCTION FROM THE BRANCH CHIEF

I want to thank the Emission Inventory Branch for the opportunity to include in *The CHIEF Newsletter* this section on emission inventory research ongoing in the Emissions and Modeling Branch (EMB). The purpose of this semiannual feature is twofold. One is to provide an overview of the research underway by AEERL to improve or develop new methods, emission factors, and software that state and local agencies can use to develop air emission inventories, project future emissions, and track progress in controlling emissions. The second purpose is to solicit responses from your respective organizations on research you may be conducting or research you may know of others conducting. The EMB coordinates its research or conducts joint research projects with non-EPA organizations, and has a continuing interest in expanding its contacts with other researchers and programs. If you know of related research or have ideas for potential collaboration on any of the research activities described in this newsletter, send me a note. We welcome your questions and comments.

Larry Jones, Branch Chief
(919) 541-7716
(919) 541-7891 (fax)

Jeff Chappell	(919) 541-3738	Chris Geron	(919) 541-4639
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Sue Kimbrough	(919) 541-2612	Chuck Mann	(919) 541-4593
Chuck Masser	(919) 541-7586	Ted Ripberger	(919) 541-2924

BRANCH HISTORY AND MISSION BACKGROUND

The Air and Energy Engineering Research Laboratory (AEERL) is one of 12 laboratories operating within EPA's Office of Research and Development (ORD). Since the early 1970s, AEERL has been in the forefront of air pollution control technology development. In the last 10 years, AEERL has expanded its efforts to include the fields of stratospheric ozone, indoor air, radon mitigation, air emission inventory methodologies, and global warming.

In the 1980s, Congress created the National Acid Precipitation Assessment Program (NAPAP). Many governmental organizations participated including EPA, the Department of Energy (DOE), and the National Oceanic and Atmospheric Administration (NOAA). As part of NAPAP, AEERL led the effort to develop the emission inventory which would be used to study the effects of acid rain within the continental United States. During the emission inventory development, it became apparent that the current available data were inadequate and in some cases obsolete. As the NAPAP effort was ending in the late 1980s, special quality assurance efforts were invoked to ensure that the emission estimates of the largest facilities throughout the country were accurate. This situation was further intensified when it became known that Congress would use the NAPAP emission inventory in the preparation of the Clean Air Act Amendments (CAAA). Special support was given by AEERL to ensure that the 1985 NAPAP nationwide emission inventory was the best ever produced.

During this intensive air emission inventory effort in 1989, AEERL made resource commitments to support both long and short term research to improve air emission inventory methodologies. AEERL formed the EMB and the Joint Emissions Inventory Oversight Group (JEIOG). The JEIOG consists of people throughout EPA who use emission inventories in their programs. This includes AEERL, the Office of Air and Radiation (OAR), including the Office of Air Quality Planning and Standards (OAQPS) and the Office of Mobile Sources (OMS), and ORD's Atmospheric Research and Exposure Assessment Laboratory (AREAL). EMB is a major participant in JEIOG and is responsible for implementing its recommendations. JEIOG's charter includes four major elements:

- provide a forum to advise on the coordination of AEERL/EMB research plans and the needs of the JEIOG related to the development and use of emission inventories
- discuss needs and recommend priorities for research work related to the methodologies, procedures, and policies for preparing emission inventories

- identify inventory outputs of support by modeling activities and other related needs by other EPA organizations
- foster cooperation and coordination between organizational units involved in developing and using emission inventories

When implementing the JEIOG research program, EMB works in cooperation with federal, state, and local air programs, industry trade associations, and private industry to develop and improve emission inventory methodologies.

BRANCH ACTIVITIES AND RESEARCH ACCOMPLISHMENTS

EMB conducts source category evaluations to develop databases for emission methodology development activities. These source category evaluations may be based on available test information in the literature or on field measurements performed by EMB on facility emission sources and/or on associated source activity levels when data are not available. In-house research is conducted to evaluate the emissions characteristics of sources under alternate modes of use (e.g., motor vehicles).

EMB is investigating existing inventories of toxic pollutants for selected urban areas and regions of the United States. Volatile organic compound (VOC) emissions are assessed to identify the component species and produce toxic emission factors. EMB also performs in-house tests of selected materials to identify toxic species in solvent and other evaporative emissions sources.

EMB conducts research to evaluate the production of various species of VOC from natural sources. In-house measurements of collected samples are performed to identify the quantity and species of the natural source emissions.

EMB also develops emission projection and economic growth projection models to determine estimates of future emissions. EMB prepares and evaluates emission projections based on current and potential increased use of alternate emission control technologies and growth projections.

EMB is conducting research in the following major areas: mobile sources, stationary sources (including utility boilers, solvents, and petroleum/gas production systems), biogenic sources, air toxics, and projections. Each of these research areas is discussed separately below. Additional research projects being performed by EMB are also discussed.

MOBILE SOURCES

Motor vehicle emission factors vary as a function of ambient temperature, vehicle age, speed, and acceleration. To develop an accurate emissions inventory, data must be obtained on the number of vehicles, their age, their speed, and acceleration for a given area (e. g., city) at a given time (e. g., 7 to 8 am). In 1991 and 1992, national experts were convened in workshops to develop ideas for making quantum leap improvements to emission inventory methodologies for highway vehicles. Major areas of uncertainty in mobile emissions projections were identified. In 1992, on-board equipment was installed on a light duty vehicle to identify specific modes of vehicle operation producing elevated emissions. In October 1992, the Georgia Institute Of Technology presented several papers on research they performed for EMB at the AWMA/EPA Emissions Inventory Specialty Conference in Durham, NC.

For FY93, mobile source research is concentrating on identifying enrichment activity factors, developing activity factors for truck traffic in urban areas, identifying and quantifying activity factors associated with super-emitters among fleet vehicles, and developing a new model to estimate mobile emissions which replaces the current activity methodologies. (Ted Ripberger)

STATIONARY SOURCES

Recent EMB research on stationary sources has focused on utility boilers, solvents, and petroleum/gas production systems. For utility boilers, EMB has issued a report on nitrogen oxide (NO_x) emissions from coal-fired utility boilers to enhance the data base available for emission factors in EPA's *Compilation Of Air Pollutant Emission Factors*, AP-42. (Julian Jones)

DOE has also made available to users the 1991 Form EIA-767, *Steam Electric Plant Operation And Design Report*, which contains fuel use, boiler, and control equipment operation data. (Chuck Masser)

In FY 92, EMB identified national and local databases on solvent sales, solvent uses, facility locations, and demographic information. EMB research identified 74 solvents, representing about 5 million tons (about one quarter) of national VOC emissions. Many of these solvents have high reactivity and contribute disproportionately to the ozone nonattainment problem. (Jeff Chappell)

Also in FY 92, oil/gas well gathering tanks and gas plant glycol dehydrators were identified as major sources of toxic emissions (greater than 10 tons per year). (Chuck Mann)

EMB's solvent emission estimation methodology development research for FY93 is focusing on producing algorithms that will estimate solvent emissions on a local basis for a selected source category. This research includes the investigation of novel or innovative approaches, including the use of expert systems utilizing inference methodologies, artificial intelligence (such as fuzzy logic and neural networks), and economic and statistical approaches. A national survey and four to six local

intensive surveys will be initiated to provide a defensible reference baseline for an initial source category that will be used to investigate the feasibility of these new approaches. The survey will be used to support the development of the methodology and to provide independent out-of-sample validation for the developed methodology, as well as to compare the performance of the existing methodology. (Jeff Chappell)

EMB will also conduct research into an improved emission estimation methodology for petroleum and gas production and distribution systems. This research will also include field testing at petroleum and gas production and distribution systems.

BIOGENIC SOURCES

EMB's recent research in biogenic emissions has focused on two primary areas. In FY 92, EMB initiated a field research and model evaluation program to improve the understanding of the processes controlling biogenic nonmethane hydrocarbon (NMHC) emissions, simulate these processes with numerical algorithms, and evaluate the accuracy of estimated emissions. EMB also initiated a research project on vegetation canopy and land use characterization. In October 1992, EMB staff presented a paper describing an alternative method for estimating biogenic VOC emissions in EPA Region 1 for the AWMA/EPA International Conference on Tropospheric Ozone: Nonattainment and Design Value Issues. Conclusions included a 10 percent drop in overall VOC emissions. This is a result of a 65 percent drop in isoprene emissions and an increase of 60 percent of other VOC species.

EMB's FY93 biogenic research includes: developing methodologies for estimating emission fluxes from forest fires, prescribed burning, and agricultural burning; using the Geographic Information Systems (GIS) to spatially analyze U. S. Department Of Agriculture (USDA) statistics on acreage burned for the different burning types; developing a national model at 1 to 4 km spatial resolution, hourly, daily, monthly, and annual temporal resolution, based on updated forest, agriculture, and satellite data, and incorporating algorithms for light and temperature effects; developing new emission factors for important crops and grasslands; validating isoprene and nonterpene emission fluxes and developing seasonal profiles; developing the Atlanta biogenics inventory to support the Southern Oxidant Study; testing the tree canopy model and scaling assumptions; investigating the effects of seasonal moisture on biogenic nonmethane organic compounds (NMOC) fluxes related to photosynthesis and completing an inventory of major compounds; developing initial emission factors for NO_x from fertilized agricultural fields; and developing methodologies to accurately measure soil NO_x emissions and aromatic oxygenated compounds. (Chris Geron)

AIR TOXICS

During FY 92, EMB conducted several air toxics emissions research projects, including (1) a review of hazardous air pollutant (HAP) emission inventory documents from 16 cities and states, (2) identification of key HAP sources which need new or improved emission factors, and (3) identification of previously unaccounted sources of HAPs.

Also during FY 92, the following six cities were tentatively selected for inventory development and/or evaluation: Baltimore, Chicago, Houston, Milwaukee, San Francisco, and Seattle. Several states were also tentatively selected for inventory development and/or evaluation: California, Louisiana, and the gulf coast of Texas.

EMB air toxics research has also included proposal of system design concepts for a toxic emission data handling system and discussion of these proposals by the JEIOG Air Toxics Subcommittee. The Geocoded Emissions Modeling and Projections (GEMAP) system developed for the Lake Michigan Ozone Study and for use by the California Air Resources Board was reviewed for this application.

EMB continues to work with the Great Lakes Commission and the State of Louisiana to enhance GEMAP for use by states for toxic emission inventories. EMB air toxics research in FY93 also focuses on the following areas: emission factor development, including identifying key sources for emission factor development, using state air toxics and other program test reports to develop improved emission factors, and emission factor testing for styrene from fiberglass coating operations; emission inventory development, including developing and evaluating emission inventories of air toxics for several cities, states, and sources; and area source methods development. (Julian Jones)

EMISSION PROJECTIONS

EMB projections research has focused on three areas: 3 percent tracking, the Economic Growth Analysis System (EGAS), and an industrial sulfur dioxide (SO₂) tracking system. In FY 91, EMB completed an initial determination of system requirements for tracking the 3 percent per year VOC emissions reduction required of ozone nonattainment areas by the CAAA. In FY 92, EMB instituted initial development activities, such as system design and development of supporting databases, and completed the "first generation" tracking system.

FY 91 and FY 92 EGAS research included the determination of system requirements for developing this economic growth model for extreme, severe, serious, and multi-state moderated ozone nonattainment areas required to project emission inventories for the purposes of photochemical grid modeling. The "first generation model" of EGAS (i.e., the beta version) was completed in September 1992.

Also in FY 92, EMB began development of procedures for tracking industrial SO₂ emissions vis-a-vis the 5.6 million ton SO₂ emissions cap imposed by Title IV of the CAAA. These procedures will be contained within a personal computer-based system.

Projections research for FY93 is continuing in all three areas: the 3 percent tracking system, EGAS, and the industrial SO₂ tracking system. Research on the 3 percent tracking system may include documentation of possible system enhancements, revision of the system based on the enhancements documented, completion of the final version of the system, and system support and maintenance. The final version of the EGAS model will be completed and a final report submitted.

Research on the industrial SO₂ tracking system will include software development, including the development of a traditional approach, which may be thought of as using accounting techniques to determine results, and a neural network that will recognize relationships between data sets, thus avoiding the time consuming development of functional relationships, equations, algorithms, and software code. (Sue Kimbrough)

OTHER EMB RESEARCH

In addition to the major research areas discussed above, EMB has also performed research on PM-10 issues and an encyclopedia of emission inventory methods. In October 1992, EMB completed Phase I of testing of antiskid materials performed near Duluth, MN.

In FY93, EMB research on PM-10 emissions will continue with the completion of the Phase II study of the suspension of antiskid materials after a storm event. This field testing, in Kansas City, MO, was just completed. Field testing is also underway at several locations nationwide to study the variability of silt loading on paved roads. In order for states to develop PM-10 emission inventories, the seasonal and climatology effects of silt loading must be known. (Chuck Masser)

During FY 92, EMB initiated Phase I of the Encyclopedia of Methods project to (1) consolidate the CAAA emissions inventory requirements into *Volume I: Statutory Requirements*; (2) establish standard procedures for entry of point source data for specific source categories into the Aerometric Information Retrieval System (AIRS) in *Volume II: Point Sources*; (3) begin the development of *Volume III: Area Sources*; and (4) begin the development of *Volume V: QA/QC*.

EMB will continue work on the Encyclopedia of Methods, with work continuing on Phases II through V. Phase II of the project will include (1) identifying and documenting state/local area source methodologies that appear to be more accurate than or superior to existing EPA methodologies and (2) documenting specific quality assurance/quality control (QA/QC) emission inventory requirements. Under Phase II, EMB will document the EPA recommended/required area source methodology, document the mobile and nonmobile source emission inventory methodology in *Volume IV: Mobile Sources*, and complete *Volume VI: Bibliography/Abstracts*. Phase IV of the project will be devoted to documenting the EPA recommended/required projection methodology in *Volume VII: Projections*, documenting the recommended/required biogenics emission inventory methodology in *Volume VIII: Biogenics* and initiating the development of *Volume IX*, incorporating any new JEIOG emissions inventory methodologies into the encyclopedia and incorporating information related to air toxics into the encyclopedia. (Sue Kimbrough)

In FY93, EMB will prepare a report containing results of analysis of emission data with recommendations for a new default methodology for estimating rule effectiveness for State Implementation Plan (SIP) emission inventory purposes. EMB will also conduct sensitivity analyses on certain parameters of the Urban Airshed Model (UAM) to determine their influence on ozone predictions. The results of these assessments will be used to determine the level of accuracy needed by emission inventories to adequately satisfy UAM requirements. EMB will also collect and evaluate data for improving methods for temporal allocation of emissions, as required to support photochemical grid and other modeling. (Chuck Mann)

EMB PUBLICATIONS

A list of current EMB publications is on the *CHIEF* Bulletin Board and a "hard copy" can be obtained by calling the *Info CHIEF*, (919) 541-5285. This list will be published in a future number of *The CHIEF Newsletter*.

HEADQUARTERS INVENTORY CONTACTS

July 1993

— EMISSION FACTORS —

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1. External Combustion	Joe McSorley	4796
2. Solid Waste Disposal	Ron Myers	5407
3. Internal Combustion	Michael Hamlin	5232
4. Evaporation Loss Sources	Ron Ryan	4330
5. Chemical Process Industry		
Organics	Dennis Beauregard (on rotational assignment)	5512
Inorganics	Ron Myers	5407
6. Food And Agricultural Industry	Dallas Safriet	5371
7. Metallurgical Industry	Dennis Shipman	5477
8. Mineral Products Industry	Ron Myers	5407
9. Petroleum Industry	Ron Ryan	4330
10. Wood Products Industry	Dallas Safriet	5371
11. Miscellaneous Sources	Dennis Shipman	5477
12. Storage Of Organic Liquids	Anne Pope	5373
Other Toxics	Anne Pope	5373
Lead	Dennis Shipman/Ron Myers	5477/5407
General information, Newsletter, Bulletin Board, XATEF, SPECIATE, Air CHIEF CD, Publications	<i>Info CHIEF</i>	5285

— EMISSION INVENTORIES —

1990 O ₃ /CO SIP Inventory Status	Sharon Nizich	2825
Inventory Guidance		
PM-10, Lead	Bill Kuykendal	5372
O ₃ /CO	David Misenheimer	5473
AIRS/AFS Emissions Data Quarterly Report	Lee Gabele	5292
AIRS Area And Mobile Subsystem (AMS)	Lee Gabele	5292
AIRS Facility Subsystem (AFS)	David Misenheimer	5473
Biogenic Inventories	Steve Bromberg	1000
Emission Statements	Mary Ann Warner-Selph	1192
Mobile Sources	Mary Ann Warner-Selph	1192
Modeling-related Inventories	Mary Ann Warner-Selph	1192
PM-10/Lead	Bill Kuykendal	5372
Quality Assurance	Sharon Nizich	2825
Tracking Reasonable Further Progress	Mary Ann Warner-Selph	1192
SIP Air Management System (SAMS)	David Misenheimer	5473
Toxics Inventories	Anne Pope	5373
Emission Trends	David Misenheimer	5473
Other	David Misenheimer	5473

— PM-10 SIPS —

OAQPS/AQMD	Larry Wallace	0906
OAQPS/SSCD	Chris Oh	(202) 308-8732

— O₃/CO SIPS —

OAQPS/AQMD	Laurel Schultz	5511
OAQPS/SSCD	Vishnu Katari	(202) 308-8717
Office Of Mobile Sources	Mark Wolcott	(313) 668-4219

— LEAD SIPS —

OAQPS/AQMD	Laura McKelvey	5497
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