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EPA

# CONTROL TECHNOLOGY CENTER

## 1990

## A YEAR OF EXPANDING SERVICE

control technology center

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## PREFACE

This report is one of the Control Technology Center's (CTC's) continuing efforts to inform participants about the CTC's contribution to the Nation's air quality program. The CTC's success reflects the need to share technical assistance and technology transfer. The CTC encourages cooperation among State and local air pollution control agencies and the U.S. Environmental Protection Agency's (EPA's) Regional Offices and the three CTC lead organizations. Those lead organizations are the Office of Air Quality Planning and Standards (OAQPS), the Air and Energy Engineering Research Laboratory (AEERL), and the Center for Environmental Research Information (CERI).

The CTC provides a unique and crucial service to air pollution control agencies. It gives technical support to State and local air pollution control agencies enabling them to make decisions on a strong technical basis. We expect the CTC to grow to fulfill the changing needs for technical assistance and technology transfer.

This report documents CTC activities from October 1989 through September 1990. It summarizes CTC projects and provides statistics on use of CTC services. It describes the CTC's growth and its immediate and long-term plans to support the Nation's air quality program.

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ACKNOWLEDGEMENT

Many people have contributed to the success of the CTC, especially EPA staff members who have responded to requests for assistance. The support and guidance of the CTC Steering Committee (SC) and the Advisory Work Group have also played an important role in the CTC's development. The Advisory Work Group is made up of representatives of the State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) and EPA's Region 3. Even more critical to the success of the CTC are the many callers from the pollution control community. They have shown their support and confidence in the CTC by continuing to use its services and recommending them to their colleagues.

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# EXECUTIVE SUMMARY

## INTRODUCTION

In June 1985, the Environmental Protection Agency (EPA) announced a strategy to reduce public exposure to toxic pollutants in the ambient air. The strategy called for State and local authorities to assume a greater regulatory role with EPA's technical and financial assistance. As a result, EPA's Office of Research and Development (ORD) and Office of Air Quality Planning and Standards (OAQPS) developed the Control Technology Center (CTC). The CTC is an innovative technical assistance program for State and local air pollution agencies and EPA's Regional Offices.

Since the CTC's inception, the program has expanded to address more than just air toxics issues. It now addresses emission source and control technology problems associated with air toxics, particulate matter, oxides of sulfur and nitrogen, carbon monoxide, lead, PM10, and volatile organic compounds (VOCs). The CTC is designed to be flexible, so that it can quickly respond to many client needs as they arise.

## THE CTC PROGRAM

The CTC provides three categories of services: telephone HOTLINE assistance, direct engineering assistance, and technical guidance. The CTC HOTLINE is a telephone number that State and local agencies may call for easy access to EPA personnel. EPA staff provides prompt assistance in a variety of ways including consultations, references to pertinent literature, and access to EPA technical data and analyses. The CTC HOTLINE number is (919) 541-0800. Direct engineering assistance projects are short-term, averaging about 3 months to complete. Projects in this category provide technical assistance to an individual State or local agency without regard to the projects' national utility. They are specific in nature and may not apply to problems in other locations. Technical guidance projects are usually long-term, taking up to a year to complete. They are broader in scope than direct engineering assistance projects and have national applications and impacts.

In FY90, the CTC experienced a 37% increase over FY89 in the number of HOTLINE calls it received. The CTC funded 24 projects, completing 16 before the end of the fiscal year, and expended $562,400 to fund all CTC activities. These statistics reflect both a growing need for CTC services and the Center's advancement to meet those needs. Over the past fiscal year the CTC responded to increased demand for its services by building its resources, staffing, outreach efforts, and base of expertise. The program expects to see a growing need for its services and its capacity to fulfill that need.

## BACKGROUND

In June 1985, EPA announced a strategy to reduce public exposure to toxic pollutants in the ambient air. The Air Toxics Strategy addressed concerns about routine and accidental releases. It also addressed the responsibilities of traditional Federal regulatory programs, such as the National Emission Standards for Hazardous Air Pollutants (NESHAPs) and New Source Performance Standards (NSPS). The Air Toxics Strategy's goal was to support State and local agencies in their new regulatory responsibilities to achieve reduced public air toxics risks. EPA's 5-year Air Toxics Implementation Plan identified the enhancement of State and local air toxics programs as one of six key components for accomplishing EPA's strategy.

The shift in regulatory responsibility from the Federal to State and local levels identified a need to transfer control technology. EPA's ORD and OAQPS implemented an innovative technical assistance program to help State and local agencies carry out their new responsibilities. The CTC is a collaborative effort among OAQPS's Emission Standards Division (ESD), ORD's AEERL, and CERI. As the program progressed, it began addressing a broader range of its clients' technical needs . Thus, the scope of the CTC has expanded significantly since its inception in FY87. It presently responds to environmental problems in the areas of sulfur oxides, nitrogen oxides, particulate emissions, VOCs, and air toxics. It also responds to questions concerning manufacturing technologies, consumer products, and most sources of air pollution.

## ORGANIZATION AND OPERATION OF THE CTC

Representatives of OAQPS, AEERL, and CERI met in early 1986, to discuss the CTC concept. They agreed to form a Steering Committee (SC) to provide direction for the program. The management staff chose SC members from the three groups with Chair and Chair-designate positions (referred to as the CTC Co-chairs) rotating annually between AEERL and OAQPS. The Co-chairs work with the staffs of ORD and OAQPS and may access contractor support to accomplish CTC goals.

The SC recognized the importance of close interaction with State and local air toxics program staff members. They established the Advisory Work Group to ensure that the CTC effectively addressed the needs of State and local air toxics programs. The Group includes State and local agency personnel and an air program representative from an EPA Regional Office. The basic program structure has been the same since the CTC's formation. Figure 1 shows a block diagram of the CTC's functional structure.

Early in the history of the CTC, the SC realized that air pollution control programs at State and local agencies are interrelated. The CTC, therefore, decided to broaden CTC assistance from air toxics control to control of other air pollutants including criteria pollutants (nitrogen oxides, sulfur oxides, particulate, lead, carbon monoxide, and ozone). Since that time, the CTC has expanded its scope to address concerns from other related technical areas. The program now encompasses emission source and control technology assessments associated with air toxics, criteria pollutants, and VOCs.

The SC established a set of guidelines to formalize the CTC's operational protocol. These guidelines define the CTC's purpose, SC membership and responsibilities, Co-chair duties, and communication procedures among CTC participants. The SC made another early key decision regarding funding. Although each organization represented in the CTC receives separate funding, the three organizations agreed to pool resources for allocation by the SC. Finally, the CTC established a set of guidelines for project selection and funding. In ranking projects for funding, the SC considers:

- The needs identified by State and local agencies (as opposed to the CTC's perception of their needs)

  The urgency of each problem as perceived by the requesting State or local agency

- The availability of expertise needed to provide a useful product

- The breadth of the product's application to other State and local jurisdictions

- The required resources compared with the value of the product

- The project's cost considering the available funds

- The relationship of a project to other EPA efforts (e.g., the potential to combine efforts with or extend the work of other projects).

The Co-chairs manage the day-to-day operation of the CTC. They are the first CTC contact for State and local personnel, usually through the HOTLINE. The Co-chairs work with the managers in their respective organizations to select the technical personnel qualified to respond to each request.

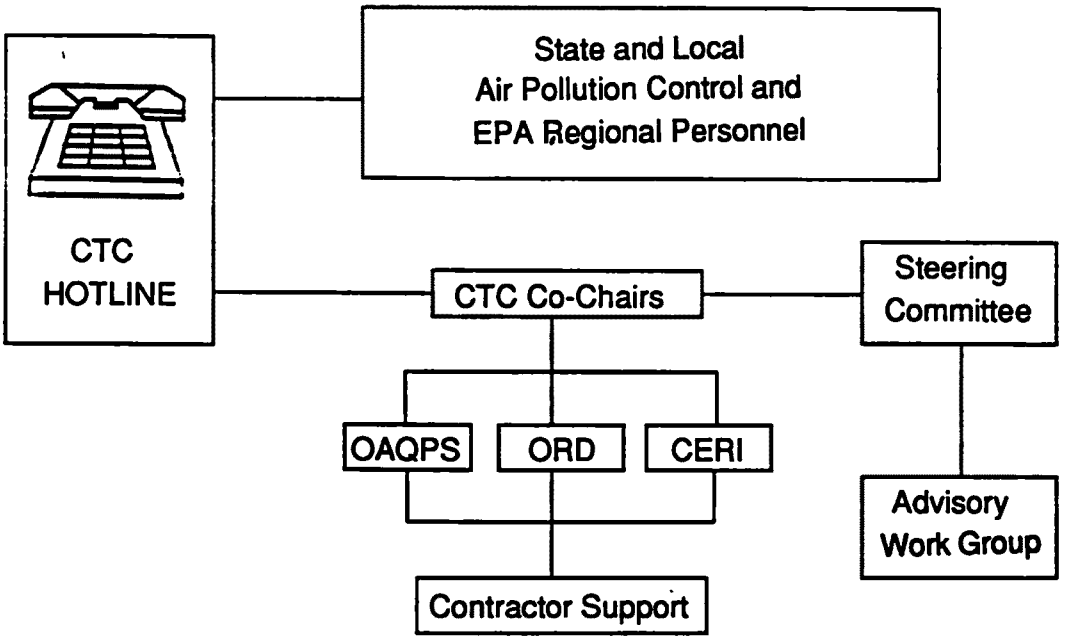


Figure 1. Participants in the CTC

The Co-chairs inform the SC of the status of projects conducted by their respective organizations. Finally, the Co-chairs work with the technical personnel to ensure that each project is within the technical, budgeting, and scheduling guidelines established by the CTC. The Co-chairs may approve small projects (costing up to $10,000) and additional funding (up to 20%) for current projects without the SC's input. This authority allows the Co-chairs to respond quickly to needs that arise between monthly SC meetings.

The SC meets to discuss the CTC budget and the status of current projects. The meeting gives the SC an opportunity to discuss potential projects and choose those it will fund. The line managers of each organization ensure the quality of work performed for the CTC and that projects follow established guidelines. The CTC asked project leaders to form teams for each project in order to combine the strengths of each lead organization. Each project team includes representatives from at least two of the three lead organizations.

The Advisory Work Group meets with members of the SC twice a year. During these meetings, the CTC briefs the Work Group on current CTC activities and addresses issues requiring guidance from this special group. The Work Group input has been valuable in helping the CTC determine how to most effectively meet State and local agency needs.

## TYPES OF CTC ASSISTANCE PROVIDED

The CTC provides three types of services: telephone HOTLINE assistance, direct engineering assistance, and technical guidance. The CTC HOTLINE provides a telephone number for State and local agencies to call for easy access to EPA personnel who provide prompt assistance in several ways. HOTLINE assistance includes consultations, references to pertinent literature, and access to EPA technical data and analyses. The HOTLINE number is (919) 541-0800. A tracking system ensures that each request receives a prompt response. The Co-chairs monitor each response to ensure that each requestor receives satisfactory assistance. For example, even if no EPA staff or consultant expertise is available for a certain request, the CTC may perform a literature search.

Direct engineering assistance is the second type of CTC service. Engineering assistance projects are short-term (taking about 3 months or less to complete). They provide technical assistance to one State or local agency. These projects are usually specific in nature and applicable to particular locations. They may result from HOTLINE calls requiring in-depth engineering analysis. In general, these projects have included review of control technology applications, plant inspections, and consultation on specific problems.

Technical guidance projects, undertaken by the CTC in its third level of assistance, are usually long-term (taking up to a year to complete). These projects are broader in scope than engineering assistance projects and are of national interest. They may result from several HOTLINE calls on the same source or industry. A technical guidance project may result from a request from a group of air pollution agencies, or comments and suggestions by the Advisory Work Group. These projects may result in control technology documents, microcomputer software, or seminars and workshops. The type of assistance the CTC provides depends on which method it chooses as the most effective technology transfer mechanism.

## FY90 PROGRAM ACTIVITY

### INTRODUCTION

The HOTLINE is the focal point of the CTC. HOTLINE activity has increased significantly during FY90 over previous years. Written requests to initiate additional and more complex technical guidance and engineering assistance activities have also increased. However, most CTC projects are initiated by HOTLINE requests. The large volume of HOTLINE activity has prompted the CTC to expand its scope from air toxics alone to include other areas of air emissions. Thus, the CTC has enlisted the help of other organizations to expand its base of expertise to support CTC objectives.

Comments from State and local agency personnel and groups such as STAPPA/ALAPCO have been positive. These comments and the significant increase in requests for assistance are evidence of the success of the CTC concept and resulting programs. This growth also foretells a continued increase in support requests in future years. Additionally, the stringent requirements that the proposed Clean Air Act Amendments are likely to impose will probably result in further CTC growth.

### PROGRAM BUDGET

The CTC had an operating budget of $562,400 for FY90. The program used these funds to conduct technical studies, provide engineering assistance, and support CTC administrative requirements. The CTC used $506,000 or over 90% of the program budget to fund direct technical assistance and engineering assistance projects. The remaining funds covered CTC administrative costs such as maintaining the data base, mailing documents, and preparing promotional materials.

### HOTLINE ACTIVITY

The CTC has experienced significant growth since its formation. The number of HOTLINE requests that the Center receives from State and local agencies and EPA Regional Offices continues to increase. In FY90 the HOTLINE received 1097 calls, which represent a 37% increase over the 803 calls received in FY89. The CTC has received favorable responses to engineering assistance and technical guidance projects that it conducted in response to HOTLINE calls and written requests.

Since its inception, the Center has received over 400 requests for one CTC-produced software program "Controlling Air Toxics" (EPA-600/8-88-092a; PB89-158745, tutorial manual, and PB89-158737, diskette). The program has become a standard tool of many air pollution agencies. In FY90 the CTC distributed over 4000 reports documenting its activities and projects.

The CTC developed a dBASE program to track HOTLINE calls. The program has allowed detailed analysis of the types of calls and issues received through the HOTLINE. It has enabled the CTC to identify areas of widespread interest. These data also identify the sources of calls, which assists the CTC in supporting projects of broad application.

Figure 2 shows the increase in HOTLINE calls received between October 1, 1987, and September 30, 1990. Figure 2 does not include the hundreds of telephone requests for CTC documents or calls made directly to EPA air program staff from referrals by previous callers. In addition, the figure does not include follow-up to HOTLINE calls. Although many calls escape official documentation, the

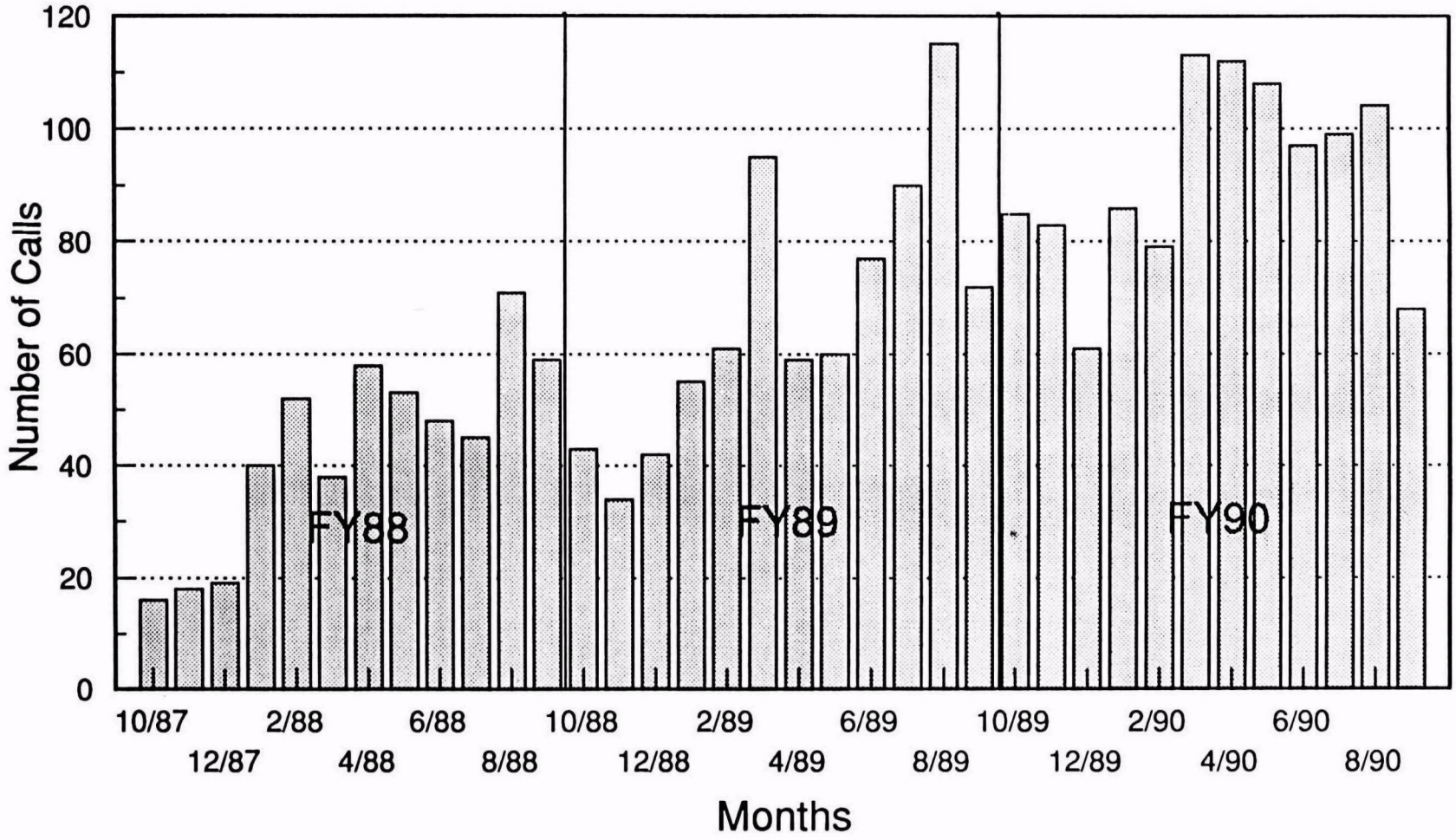


Figure 2. Monthly HOTLINE figures for FY88, FY89, and FY90

technical staff has noted an increase in telephone volume. The CTC managers are taking steps to monitor calls that are presently by-passing the HOTLINE. HOTLINE data, records of documents requests, and estimates of direct-to-staff calls reflect approximately 165 requests for assistance per month. Figure 3 illustrates the rate of increase in officially documented HOTLINE calls of FY90 over FY88 and FY89. FY90 HOTLINE calls show an increase over FY89 calls similar to that of FY89 over FY88.

The 1097 CTC HOTLINE calls received in FY90 were from a wide range of governmental clients. Figure 4 shows the distribution of those calls received from EPA Regional Offices, State and local agencies, and other governmental sources. The CTC received the majority of HOTLINE calls (59%) from State agencies and clients in the District of Columbia and U.S. Territories. The percentage of calls from Regional Offices was approximately 12%. However, this number represents an 18% increase over the number of Regional calls received in FY89. This increase indicates the significant success of outreach activities the CTC conducted in FY90. Those activities included formal briefings to staffs at EPA Regional Offices 6, 8, 9, and 10. The Center initially targeted only State and local agencies as primary CTC clients.

Since local agencies employ approximately the same number of people as State agencies, the CTC expected the two groups to initiate a similar percentage of calls. However, the CTC received only 249 calls (22.70% of the total) from local agencies as opposed to 645 calls (58.80%) from State agencies. The difference suggests that local agencies are less familiar with CTC assistance than are State agencies. Foreign agencies, universities, EPA contractors, non-Regional EPA offices, and other governmental agencies initiated the remaining 71 calls representing 6.5% of total HOTLINE calls received in FY90.

Figure 5 shows the numbers of HOTLINE calls from State agencies within the 10 EPA Regions. Figure 6 shows the distribution of FY90 HOTLINE calls among the States. The relatively low number of calls received from some Regions and States may provide a basis for additional targeted outreach activities.

PROCESS AND POLLUTANT ANALYSIS

Tables 1 and 2 show the results of a HOTLINE data analysis to determine which processes and pollutants were the most frequent subjects of HOTLINE calls. The tables combine processes with similar control strategies, and similar pollutants. The tables reflect only processes and pollutants for which the HOTLINE received two or more calls.

FY90 CTC projects show a correlation with the processes which were the subject of the most calls. Nine of the CTC's technical guidance and engineering assistance projects (on asphalt, fiberglass, foam blowing, painting and coating, printing and graphics, miscellaneous incineration, and natural gas and petroleum products) correspond to processes ranking in the top 10 shown in Table 1. The topics of other FY90 projects which appear in Table 1 are chemical manufacturing, dry-cleaning, food and beverage manufacturing, hazardous waste incineration, iron and steel, landfills, pharmaceuticals, tire burning, wastewater treatment, wood combustion, and waferboard. The processes which were the subjects of two or more HOTLINE calls represent about 68% of the total calls received.

Table 2 shows that more than 80% of the calls received were on one of the pollutants listed in the table. Correlations between this list and actual CTC projects are less obvious. This is because most CTC projects relate to processes which include multiple pollutants. However, most CTC projects relate to VOCs or air toxics. Forty-four percent of FY90 HOTLINE calls related to VOCs and toxics emissions.

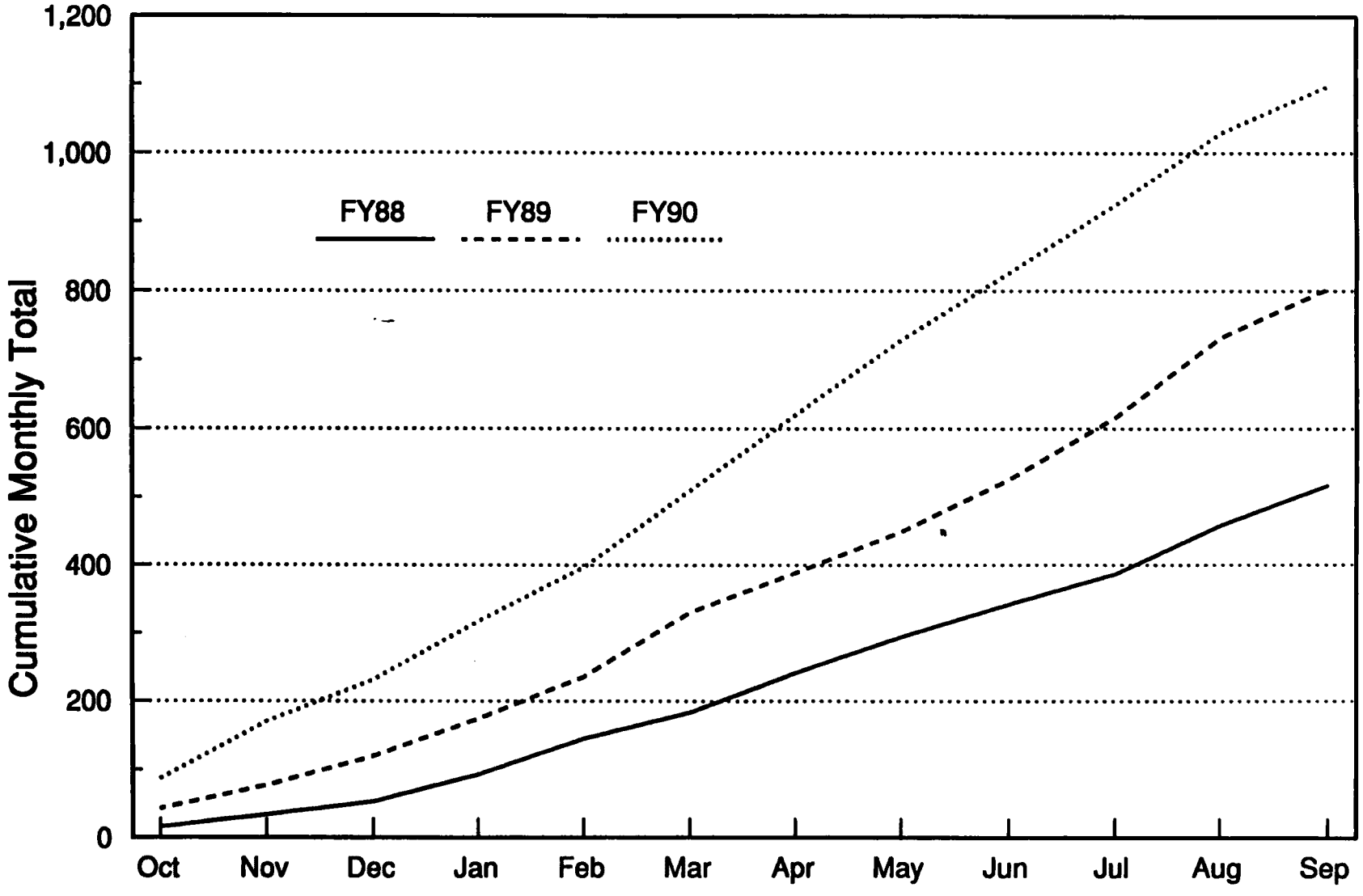


Figure 3. Comparison of HOTLINE calls received in FY88, FY89, and FY90

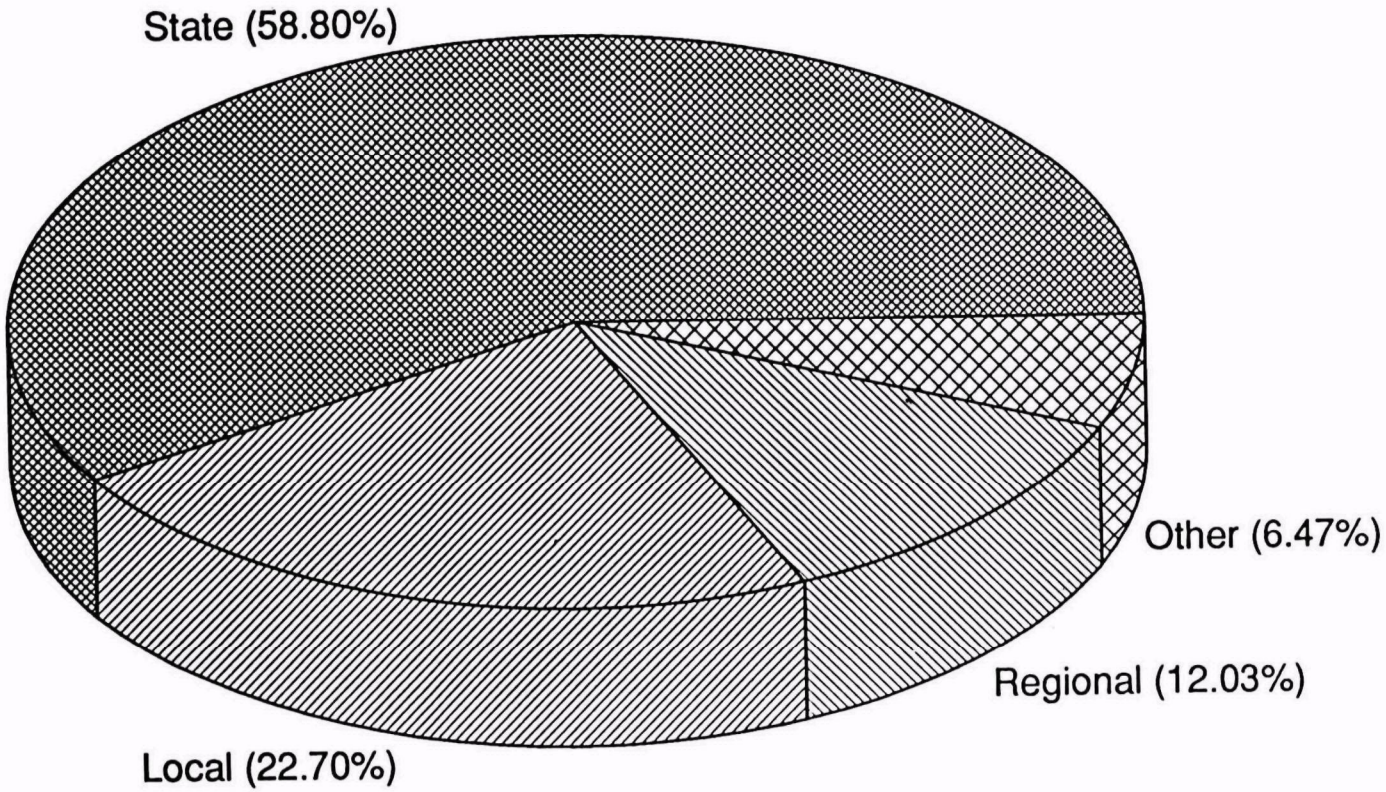


Figure 4. Distribution of FY90 calls by origin

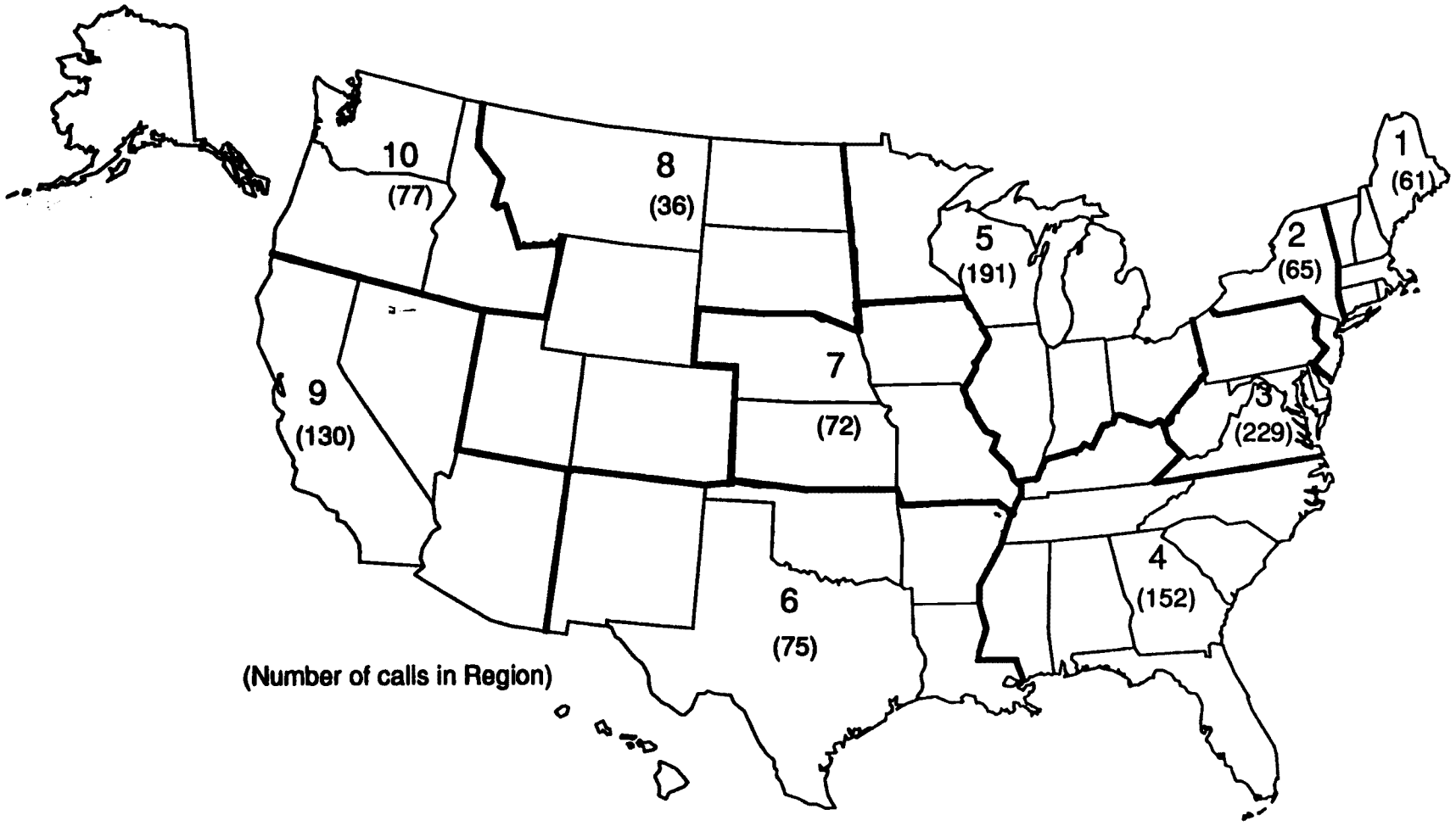


Figure 5. Distribution of State agency HOTLINE calls by Region

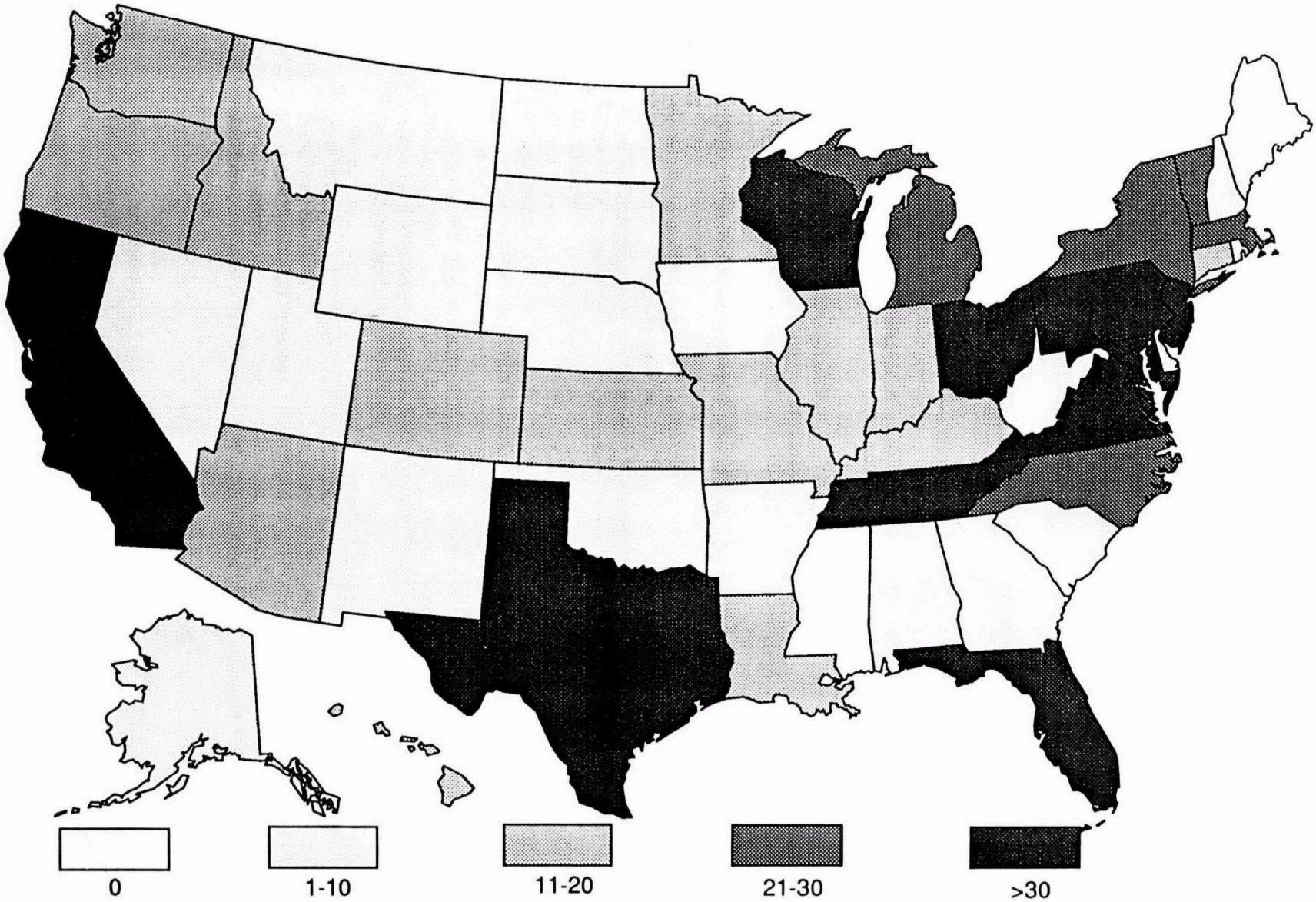


Figure 6. Distribution of HOTLINE calls by State

Table 1. Distribution of Calls Received by Process*

| Process | No. of Calls | % of Calls |
|---|---|---|
| Painting & Coating | 73 | 6.65 |
| Miscellaneous Incineration | 63 | 5.74 |
| Boilers | 44 | 4.01 |
| Printing | 32 | 2.92 |
| Natural Gas & Petroleum Processing | 30 | 2.73 |
| Medical Waste Incineration | 28 | 2.55 |
| Asphalt | 22 | 2.01 |
| Foam Blowing | 19 | 1.73 |
| Municipal Waste Incineration | 18 | 1.64 |
| Fiberglass Manufacturing | 17 | 1.55 |
| Tire Burning | 16 | 1.46 |
| Steel Mills/Electric Arc Furnaces | 15 | 1.37 |
| Dry-cleaning | 14 | 1.28 |
| Electroplating | 14 | 1.28 |
| Food & Beverage Manufacturing | 14 | 1.28 |
| Treatment, Storage & Disposal Facilities | 14 | 1.28 |
| Hazardous Waste Incineration | 13 | 1.19 |
| Landfills | 13 | 1.19 |
| Wastewater Treatment | 13 | 1.19 |
| Wood Products | 12 | 1.09 |
| Chemical Manufacturing | 11 | 1.00 |
| Contaminated Soil Treatment | 11 | 1.00 |
| Hospital Sterilizers | 10 | 0.91 |
| Kraft Pulp/Paper Mills | 10 | 0.91 |
| Air Stripping | 9 | 0.82 |
| Gas Turbines | 9 | 0.82 |
| Power Plants | 9 | 0.82 |
| Above Ground Storage Tanks | 9 | 0.82 |
| Waferboard | 8 | 0.73 |
| Coke Ovens & By-Products | 7 | 0.64 |
| Diesel Engines | 7 | 0.64 |
| Autobody Refinishing | 6 | 0.55 |
| Cement Manufacturing | 6 | 0.55 |
| Flares | 6 | 0.55 |
| Foundries | 6 | 0.55 |
| Gasoline Handling | 6 | 0.55 |
| Internal Combustion Engines | 6 | 0.55 |
| Metal Fabrication | 6 | 0.55 |
| Welding | 6 | 0.55 |
| Degreasers | 5 | 0.46 |
| Iron Foundries | 5 | 0.46 |
| Copper Smelters | 5 | 0.46 |
| Wood Combustion | 5 | 0.46 |
| Wood Stoves | 5 | 0.46 |
| Aerospace | 4 | 0.36 |
| Cogeneration | 4 | 0.36 |

(Continued)

Table 1. Distribution of Calls Received by Process (Continued)

| Process | No. of Calls | % of Calls |
|---|---|---|
| Fabrics | 4 | 0.36 |
| Furniture Manufacturing | 4 | 0.36 |
| Lead-acid Storage Batteries | 4 | 0.36 |
| Plastic Manufacturing | 4 | 0.36 |
| Refrigeration/Air Conditioning | 4 | 0.36 |
| Transportation | 4 | 0.36 |
| Adhesives | 3 | 0.27 |
| Automobile Manufacturing | 3 | 0.27 |
| Brick Manufacturing | 3 | 0.27 |
| Dust Control | 3 | 0.27 |
| Fertilizer | 3 | 0.27 |
| Grain Processing | 3 | 0.27 |
| Rock Quarries | 3 | 0.27 |
| Lead Smelters | 3 | 0.27 |
| Aluminum Smelters | 3 | 0.27 |
| Underground Storage Tanks | 3 | 0.27 |
| Abrasive Blasting | 2 | 0.18 |
| Accidental Release | 2 | 0.18 |
| Concrete Crushing | 2 | 0.18 |
| Electrostatic Precipitators | 2 | 0.18 |
| Metal Recycling | 2 | 0.18 |
| Silver Recycling | 2 | 0.18 |
| Rubber Curing & Recycling | 2 | 0.18 |
| Solvent Substitution | 2 | 0.18 |
| Stack Testing | 2 | 0.18 |
| Unrelated to a Process | 216 | 19.69 |
| Other Processes | 144 | 13.13 |
| Total | 1097 | 100.00 |

*Figures represent processes for which two or more calls were received and the percentage of the number of calls for each process to the total number of calls received in FY90.

Table 2. Distribution of Calls Received by Pollutant*

| Pollutant | No. of Calls | % of Calls |
|---|---|---|
| Volatile Organic Compounds | 235 | 21.42 |
| Various Pollutants** | 156 | 14.22 |
| Air Toxics (General) | 152 | 13.86 |
| Particulates | 74 | 6.75 |
| Nitrogen Oxides | 39 | 3.56 |
| Chlorofluorocarbons | 18 | 1.64 |
| Sulfur Oxides | 17 | 1.55 |
| Chromium | 15 | 1.37 |
| Formaldehyde | 15 | 1.37 |
| Styrene | 15 | 1.37 |
| Lead | 14 | 1.28 |
| Odors | 13 | 1.19 |
| Dioxins | 12 | 1.09 |
| Carbon Monoxide | 11 | 1.00 |
| Asbestos | 9 | 0.82 |
| Ethylene Oxide | 9 | 0.82 |
| Perchloro Ethylene | 9 | 0.82 |
| Mercury | 7 | 0.64 |
| Ammonia | 6 | 0.55 |
| Fluorides | 6 | 0.55 |
| Metals | 6 | 0.55 |
| Ozone | 6 | 0.55 |
| Chloroform | 5 | 0.46 |
| Benzene | 4 | 0.36 |
| Hydrogen Sulfide | 4 | 0.36 |
| Dust | 3 | 0.27 |
| Sufuric Acid | 3 | 0.27 |
| Methylene Chloride | 3 | 0.27 |
| Pentane | 3 | 0.27 |
| Trichloro Ethylene | 3 | 0.27 |
| Visible Emissions | 3 | 0.27 |
| Acetone | 2 | 0.18 |
| Arsenic | 2 | 0.18 |
| Carbon Disulfide | 2 | 0.18 |
| Isocyanates | 2 | 0.18 |
| Magnesium | 2 | 0.18 |
| Methyl Ethyl Ketone | 2 | 0.18 |
| Toluene | 2 | 0.18 |
| Other Pollutants† | 40 | 3.65 |
| Unrelated to Pollutants†† | 168 | 15.31 |
| Totals | 1097 | 100.00 |

*Figures respresent pollutants for which two or more calls were received and the percentage of the number of calls for each pollutant to the total number of calls received in FY90.

**Calls relating to more than one pollutant, which may or may not be included in this table.
†Calls relating to pollutants not on this table.
††General questions not related to pollutants.

## ENGINEERING ASSISTANCE AND TECHNICAL GUIDANCE PROJECTS

The CTC provides all products resulting from its projects to State, local, and Federal Agency personnel free of charge. The CTC directs industry and consultants to the National Technical Information Service (NTIS) for documents and software. The CTC's technical guidance products, as anticipated, have found large audiences. For example, the CTC has received over 400 requests for the document, "Air Stripping of Contaminated Water Sources—Air Emissions and Controls" (EPA-450/3-87-017; PB88-106166) and the computerized permit review program, "Tutorial Manual for CAT (Controlling Air Toxics), Version 1.0" (EPA-600/8-88-092a; PB89-158745). The CTC attributes the far fewer requests for reports on its engineering assistance projects than on its technical assistance efforts to the specificity of the former. In FY90 the CTC received over 4000 requests for reports on completed CTC projects.

Table 3 lists the 24 engineering assistance and technical guidance projects that the CTC funded in FY90. The list demonstrates the breadth of CTC activity during the year. The projects range from efforts with very specific and unique scopes to efforts with broad application and interest. Appendix A presents abstracts of completed CTC projects. These abstracts reflect CTC projects which resulted in formal published reports or informal reports to CTC clients. Appendix B presents summaries of FY90 projects that were still ongoing at the end of the fiscal year.

Table 4 shows a breakdown of FY90 CTC projects by project type. Four of the 24 projects relate to control technology evaluation, and 6 relate to emission characterization. Of the 24 projects that the CTC funded in FY90, 6 were engineering assistance and 18 were technical guidance.

The CTC spent more than $506,400 to fund projects in support of its clients during FY90. The CTC expended $196,000 to fund engineering assistance projects and $310,400 to fund technical guidance projects during the year. The distribution of CTC funds illustrates the program's emphasis on developing technical guidance reports. That emphasis reflects the broadest interests of CTC clients as identified by HOTLINE activity and written requests for technical assistance.

## CTC CAPABILITY ENHANCEMENT

Some CTC HOTLINE requests involve complex issues that require assistance from multiple organizations. For example, the CTC sometimes receives inquiries on the controls and health effects of the same emission stream. Such issues are directed to organizations with different expertise, who respond separately to each part of the request. Sometimes appropriate expertise is not immediately available, or a request is beyond the scope of the CTC. In such cases, the Center may direct the caller to resources outside the CTC. However, the CTC's ability to direct the requestor to the appropriate EPA resources has typically satisfied the requestor.

The CTC is continuing to improve the broad technical capabilities of its many areas of responsibility. Efforts to broaden the base of CTC expertise include the use of contractor assistance. EPA has issued several general work assignments allowing the CTC to employ contractors for different CTC project requirements. This expansion not only broadens the base of CTC expertise but also supplements EPA expertise when workloads restrict in-house staff participation in technical efforts.

Table 3. CTC Projects Funded in FY90

| Project Title* | Amount Funded in FY90 ($1000) |
|---|---|
| "Emission Factors for Iron Foundries—Criteria and Toxic Pollutants" | 10.0 |
| Landfill Air Emissions Estimation Model | 29.0 |
| "Surface Impoundment Modeling System (SIMS) Version 2.0 Users' Manual" | 12.0** |
| Colorado/Waferboard Press Vent Emissions | 15.0 |
| Colorado/Weighted Carbon Monoxide Emission Correlation for Woodstoves | 7.0 |
| "Test Report: Method Development and Evaluation of Draft Protocol for Measurement of Condensible Particulate Emissions" | 8.0† |
| "Assessment of the Controllability of Condensible Emissions" | 4.0† |
| "Affordability Analysis of Lead Emission Controls for a Smelter-Refinery" | 6.6† |
| Evaluation of Alternatives to Asphalt Roofing | 45.0 |
| Evaluation of Excess Benzene Emissions | 7.4 |
| "Assessment of VOC Emissions from Fiberglass Boat Manufacturing" | 2.0† |
| Flexible Packaging | 6.0† |
| HAP Manual Update | 4.0† |
| Maryland/Yeast Manufacturing | 70.0 |
| New Mexico/Mixed Waste Combustion | 70.0 |
| $NO_X$ Control Technology Data Source Book | 20.0† |
| Pennsylvania/Iron Oxide Process Analysis | 13.2† |
| PERC Waste Test Method | 6.0 |
| Pharmaceutical Plant Evaluation | 11.2 |

(Continued)

Table 3. CTC Projects Funded in FY90 (Continued)

| Project Title | Amount Funded in FY90 ($1000) |
|---|---|
| Polystyrene Foam Manufacturing | 35.0 |
| Tire Burning, Additional Analysis | 10.0 |
| Ultraviolet Coating Technology | 20.0 |
| Vermont/Wood Waste Incineration | 35.0 |
| Virginia/Fluff Combustion | 60.0 |
| Total | 506.4 |

*Titles in quotation marks represent projects for which the CTC published formal reports, which are referenced in Appendix A.

**The CTC portion of the funding for a project that was co-funded by the Technical Support Division of OAQPS.

†The FY90 portion of the funding for a project that was initially funded in a previous fiscal year.

Table 4. CTC Projects by Type

| Project Type | Total | Percent of Total |
|---|---|---|
| Control Technology Evaluation | 4 | 16.7 |
| Emission Characterization | 6 | 25.0 |
| Industry and Process Studies | 7 | 29.2 |
| Software Tools* | 2 | 8.3 |
| Permitting Assistance | 2 | 8.3 |
| Testing Methods | 2 | 8.3 |
| Technical Evaluation | 1 | 4.2 |
| Total | 24 | 100 |

*The CTC targets software tools for permit review, engineering evaluation, and estimation of emission factors.

The CTC has taken steps to expand its technical support capability into areas not presently addressed by the CTC. The CTC has identified technical experts in State agencies and Regional Offices, who have agreed to respond to technical requests. Other EPA offices have made agreements with the CTC to provide technical assistance in areas not already serviced by the CTC base of expertise.

## HOTLINE DATA BASE

The HOTLINE data base has assisted the CTC in improving communication within EPA and recognizing staff participation in CTC efforts. The CTC generates reports from the data base for several purposes. The data base provides information for tables like those presented earlier in this report to aid in the selection of CTC projects. It also provides reports that show managers which of their staff members are responding to HOTLINE calls. The reports also demonstrate how much time staff members spend responding to HOTLINE requests. These reports inform the managers of HOTLINE activity and recognize staff members contributing to the program. The CTC also sends reports to each Regional Office. These reports detail the number of calls from that region and the origins and subjects of calls.

In late FY90, the CTC evaluated a random, non-statistical set of HOTLINE assistance records. The CTC contacted 26 individuals who had called the HOTLINE between July and September 1990. The individuals represented 9 different EPA Regions and requested HOTLINE assistance on 14 different processes. Only one of the callers commented that the CTC did not have the information that he required, but he stated that he would use the HOTLINE again. The remaining callers were satisfied with the CTC's responses to their requests. Many individuals contacted said that the CTC provides a valuable service.

## CTC OUTREACH

The increasing number of HOTLINE calls has historically shown a direct correlation with activities to promote the CTC program. For the first 6 months of operation, the CTC received about 6 calls per month. During June 1987, the first outreach activities began. The CTC distributed more than 3000 one-page placards at the Air Pollution Control Association (APCA) meeting in New York City. The first of several articles discussing the CTC appeared in the National Air Toxics Information Clearinghouse (NATICH) newsletter about the same time. The CTC Co-chairs also sent more than 500 letters to State and local agency personnel on the NATICH mailing list informing them of CTC services. For the next 6 months, the CTC received about 20 calls per month. In January 1988, the CTC Co-chairs presented information on the CTC at an EPA Air Pollution Training Institute course for permit writers. Following the course, the number of calls increased to about 40 per month. In FY89, the number of calls received by the HOTLINE averaged 70 per month.

The monthly rate of HOTLINE calls gradually increased during the first three quarters of FY89. The CTC's quarterly newsletter, developed as a CTC outreach tool, was first published in July 1989. It resulted in a dramatic increase in CTC HOTLINE calls in FY89. Calls averaged 70 per month and continued to increase in FY90 to an average of 92 calls per month. The CTC News highlights current CTC efforts and recently completed projects. The newsletter also provides ordering information for reports on those projects. The quarterly publication circulates the CTC HOTLINE number and provides a form for those wishing to be on the CTC News mailing list. The newsletter also solicits feedback on CTC assistance. The mailing list for the CTC News has grown to almost 2000 addressees. Many recipients of the newsletter have commented that CTC activities relate to their work. The Center maintains a list of project descriptions for individuals requesting information about the CTC. In early 1990, the CTC News included a checklist for ordering CTC documents. The checklist resulted in more than 1500 requests for documents, once again expanding the CTC's audience.

The CTC Co-chairs initiated a program of Regional Office and State and local agency visits to further promote CTC services. During these visits the CTC informs Regional, State, and local agency personnel on CTC objectives. By September 1990, CTC staff had visited four Regional Offices and several State and local agencies and presented program updates to STAPPA/ALAPCO.

## FUTURE DIRECTION

The CTC management constantly identifies and reviews ideas for improving CTC services to its clients. Those new ideas include update briefings to various agencies, expansion of the CTC expertise base, and an increase in the scope of research activities. The CTC plans to continue its present efforts, while improving the existing system and identifying new areas for improvement.

The CTC is informally linked with other OAQPS and ORD service centers such as Air RISC and the Emission Measurement Technical Information Center. The CTC has coordinated activities with these centers and seeks to improve this coordination. For example, the CTC and Air RISC have worked together to address requests for assistance which involve both control technology and health effects. The CTC has referred State and local agencies to other EPA hotlines and clearinghouses when those services could best respond to the callers' needs.

The CTC management will continue outreach activities for specific target agencies and organizations. For example, few CTC requests came from Region 8, which encompasses six States. The CTC will, therefore, initiate further State and Regional outreach activities in that area.

The CTC's plans for FY91 also call for the acquisition of new staff members to help meet new CTC responsibilities. New responsibilities may include providing support, not only to State and local governmental agencies, but also to the business community. The CTC would play a major part in providing technical services to this potential new client category. To support this responsibility the CTC will establish a computer tracking system (similar to the one used to track assistance to State, local, and Federal agencies) to track calls from non-governmental agencies.

The CTC also plans to establish an electronic bulletin board in FY91 for access by clients who have personal computers equipped with communication software and modems. The bulletin board will allow CTC clients to enter requests for assistance during non-business hours, order CTC documents, and download CTC-developed software and certain documents. Bulletin board users will be able to check the progress of CTC projects, review technical bulletins on emerging emission control issues, and exchange messages with other clients. The bulletin board will benefit the CTC in other ways. It should absorb some of the increase in requests for assistance due to the CTC's growing popularity and expanded clientele resulting from the 1990 Clean Air Act Amendments.

Cooperation between the CTC and the RACT/BACT/LAER (Reasonably Available Control Technology/Best Available Control Technology/Lowest Achievable Emission Rate) Clearinghouse (formerly the BACT/LAER Clearinghouse) has increased over the years. That increased cooperation was a result of the programs' common goal, to transfer control technology to State and local agencies. In FY91, these service activities will be more closely integrated within the structure of the CTC. As a result, the expanding and improved Clearinghouse data base will become a common tool in addressing the needs of CTC callers.

## CONCLUSIONS

The CTC has shown that it is an effective mechanism for technology transfer from EPA to State and local agencies. The structure of the CTC has allowed cooperation among the three EPA lead organizations (OAQPS, AEERL, and CERI) and input from STAPPA/ALAPCO and the Regional Offices. The CTC's team approach to projects has combined the expertise and experience of regulatory and research and development personnel. That combination has improved the quality and depth of CTC assistance.

The CTC has received positive feedback from its State, local, and Federal clients on its three levels of assistance (engineering assistance, technical guidance, and HOTLINE assistance). The number of HOTLINE calls and requests for assistance continues to increase. Many requestors continue to contact the HOTLINE with new requests.

Increased demand for CTC services and positive feedback indicate that this program has satisfied a need among its clients. The CTC anticipates expansion into the private sector. That expansion suggests that the CTC may have an even greater role to play in the overall air program. The CTC SC has recommended continued expansion of its technical base and resources to satisfy the anticipated demand within available funding.

## APPENDIX A

## SUMMARIES OF COMPLETED PROJECTS

"Affordability Analysis of Lead Emission Controls for a Smelter-Refinery" (1)

The CTC (Control Technology Center) responded to a request by the Environmental Protection Agency (EPA) Region 7 to evaluate the affordability and economic impact of additional control measures for a smelter-refinery to meet the lead emissions standard. The analysis emphasized the impact of control costs on the smelter-refinery's profitability. The study incorporated cost data from two lead smelter studies and existing firm and industry data.

The CTC published a report that examines the economic impacts of EPA's ambient air lead standard on a primary lead smelter-refinery in Herculaneum, Missouri. The facility is the largest primary lead producer in the U.S. However, it has been impacted by the decrease in lead consumption, worldwide overcapacity, low prices and environmental regulations. The decline in lead consumption is considered to be completed and demand has stabilized. The facility currently complies with EPA's sulfur dioxide ($SO_2$) emissions standard, but faces other environmental, safety, and health regulations that contribute significantly to control costs. For example, EPA may establish stricter lead and $SO_2$ standards, and surface impoundment solids at lead smelters may be regulated as hazardous waste under the Resource, Conservation and Recovery Act.

The CTC report presents two alternative estimates of the cost of controls for Herculaneum to comply with the current lead emissions standard. The two compliance cost estimates examined varied greatly. Although, the facility could afford either option, the higher cost would impact Herculaneum's earnings significantly. Additional research may be necessary for a more definitive estimate of compliance costs.

Alaska Oil Spill Support

The Alaska Department of Environmental Conservation (ADEC) requested an EPA evaluation of technical questions pertaining to the incineration of wastes resulting from the Exxon oil spill at Valdez. In response, the CTC formed a team to provide quick expert advice to Alaska. Project leaders visited the site, attended public hearings, and participated in public workshops. The CTC provided recommendations to the State of Alaska.

Exxon had suggested incineration of the estimated 8,000 tons of solid waste resulting from the Valdez oil spill. However, the oil company raised concerns over the environmental acceptability of the disposal process. The CTC concluded that use of appropriate technology and operating procedures would cause no adverse environmental impact.

The CTC presented a brief review and assessment of the thermal treatment technologies that Exxon might use to dispose of certain waste resulting from the oil spill. Generally, EPA and the ADEC concurred with Exxon's basic waste management plan, but questioned the appropriateness of the proposed incineration technologies. EPA and Alaska considered four major issues in approving the thermal treatment:

- Compliance with applicable environmental regulations
- Compatibility with specific waste characteristics
- Public perception of the plan, and
- Cost

The State's consideration of public concern, which establishes acceptable performance levels, prompted them to recommend that incinerators meet certain criteria. The criteria were similar to requirements for hazardous waste incineration operation to meet environmental regulations and permit conditions. The CTC provided a brief review of regulatory requirements, a discussion of various generic classes of incineration technologies, and an assessment of their applicability to the Valdez waste.

"ASPEN Expert System for Steam Stripping Calculations: Users' Manual" (2)

The CTC and the Office of Air Quality Planning and Standards (OAQPS) developed the Expert System, a personal computer (PC) software program that uses the "Advanced System for Process Engineering" (ASPEN) user model. The model describes the process of steam stripping of volatile organic compounds (VOCs) from wastewater feed streams. It allows the user to run an ASPEN steam stripping simulation without any knowledge of ASPEN programming.

ASPEN is a commercial software package for chemical process design and simulation, which allows modular building of flowsheet blocks to represent a steam stripper with or without air emission controls. It also contains an extensive physical property library and costing routines.

The "front-end" Expert System will read a general ASPEN input file, modify it according to data supplied by the user, and create a new input file tailored to the problem at hand. The program can be run on an IBM-compatible (MS-DOS) PC equipped with 640K of RAM. The software has interactive menus and on-screen help and instructions making most operations self-explanatory.

The user loads an existing data set or chooses default values using the Expert System's first screen. The user then selects the items of interest from the main menu and enters the appropriate data. When data entry is complete the program returns to the main menu. After creating a custom ASPEN input file on the Expert System, the input file is uploaded from the PC to an EPA-VAX for execution by telephone with a modem-equipped PC and appropriate communications software.

The Expert System user can run the model in either the rating or design mode. The user can evaluate an existing stripper design in the rating mode, by entering basic design parameters such as flow rates, concentrations, and tower dimensions. In the design mode, the model will calculate the necessary optimum tower design to achieve the specified effluent limits and provide sizing information for the selected control equipment. The user need enter only the wastewater flow rate, influent concentrations, desired removal rates or effluent concentrations, and the air emission control selected. In both modes the steam stripper ASPEN model determines the capital and operating costs associated with the stripper as well as the control equipment.

State and local pollution control agencies may use the ASPEN steam stripper model for evaluating control technologies and determining potential air toxics emissions. The model offers three options for controlling VOC air emissions from the steam stripper: condensation using a refrigerant in a secondary condenser, fixed-bed carbon adsorption, and catalytic oxidation.

"Assessment of the Controllability of Condensible Emissions" (3)

The CTC provided support to the State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) Air Toxics Subcommittee in acquiring a better understanding of condensible emissions from an air toxics perspective. The major objectives of the study were to: (a) develop a data base on condensible emissions, (b) determine chemical makeup of condensible emissions, (c) evaluate the effectiveness of various control devices in reducing condensible emissions , and (d) identify modifications to improve performance.

Two data bases were developed from a review of emissions source test reports from EPA's Emission Measurement Branch (OAQPS/Technical Support Division) files and from the State of California. The Condensibles Data Base contains information on condensible emissions covering 43 emission source categories. The Speciated Condensibles Data Base focuses on the chemical composition of condensible emissions. For the purposes of this study, the back-half catch of the EPA Reference Method 5 or its equivalent was considered to represent the condensible fraction.

Based on the data contained in the Condensibles Data Base, source categories with a relatively high percentage of condensibles in the total particulate catch (i.e., greater than 50%) included the following: plywood manufacturing, asphaltic concrete, electric utilities, fertilizer manufacturing, and secondary lead smelting. From the limited data on chemical composition of condensed particulate matter, the toxic fraction of condensed particulate matter (composed of arsenic, beryllium, cadmium, chromium, lead, mercury, and vanadium) was less than 1% in most cases.

For many sources in the Condensibles Data Base, wet scrubbers including venturi scrubbers, fabric filters, electrostatic precipitators (ESP's), and wet ESP's were the commonly employed particulate matter control devices. There was a wide variation in performance of these devices in controlling condensible emissions. This variation was attributed to differences in emission source characteristics such as temperature, composition, and concentration. Although limited performance data were available for specific control devices, venturi scrubbers and other wet scrubbers appeared to be more effective in reducing condensible emissions than other control devices.

No general conclusions were drawn regarding controllability of specific components because of limited data. Modifications in control device operation or design that would affect potential reductions in condensible emissions include: (a) operating at lower temperatures and higher humidity levels to enhance condensed particulate formation prior to the control device, (b) adding an ionizing section before wet and venturi scrubbers to improve collection efficiency of the fine particulate, and (c) using gas conditioning agents to induce condensed particle agglomeration.

"Assessment of VOC Emissions from Fiberglass Boat Manufacturing" (4)

The CTC conducted a survey to define the nature and scope of VOC emissions from the production of fiberglass marine craft. Earlier studies indicated that over 22,000 tons of VOC per year are emitted from fiberglass boat manufacturing in the U.S., mainly from styrene and cleanup solvents. Studies have also shown that the fiberglass industry may impact local air quality in coastal areas and locations near recreation waters, where boat manufacturing is concentrated.

The CTC study identified total industry VOC emissions and emissions from different industry segments, specific processes used by the industry, industry structure, and economic data. The CTC published a report summarizing its findings, including the evaluation of VOC control options. The report also described the geographic distribution of fiberglass boat manufacturing facilities. Although directed mostly toward boat manufacturing, the findings of the study are also applicable to other molded fiberglass operations.

The study's findings include industry characterization, process emissions, emission reductions through process or material changes, and emission reductions through add-on controls. The report includes the recommendation of additional study of the potential control options that it described. The report cited the substitution of lower VOC-containing materials as having the greatest potential for VOC emission reductions with low costs. The study also concluded that three control devices are reputed to potentially control VOC and styrene emissions from fiberglass boat manufacturing facilities. However, U.S. fiberglass boat manufacturing facilities are not applying the add-on controls cited yet, pending further evaluation of their technical and economic viability.

Colorado Weighted Carbon Monoxide Emission Correlation for Woodstoves

The CTC assisted the State of Colorado in expanding EPA's certified stove data base to calculate Colorado weighted particulate and carbon monoxide (CO) averages. The project's objective was to investigate and clarify possible relationships between the emissions of particulate matter (PM) and CO for residential wood burning appliances. The more specific goal of the study was to determine if applicants certified under the EPA 1990 Phase II PM standard could also meet the Colorado Phase II CO standard. The CTC accomplished these objectives by compiling a data base of woodstoves meeting the EPA 1990 standard, listing the EPA weighted PM, and calculating Colorado weighted CO emission averages.

The CTC used 19 woodstove reports containing measured emissions passing EPA's 1990 standard. The reports also contained sufficient CO emission data to achieve the study's objectives. The woodstoves included in the reports consisted of 6 stoves equipped with catalysts and 13 for non-catalytic units.

The CTC produced a table listing the catalytic woodstoves with the corresponding weighted average PM and CO emissions. The study also produced a graph plotting the Colorado weighted CO emissions against the EPA- weighted PM emissions. No relationship appeared between emissions of CO and PM. However, all of the catalytic units which passed EPA's 1990 PM standard would also meet the Colorado CO limit. Another table depicts non-catalytic woodstoves, which produce significantly higher CO emissions than the catalytic units. Only three of the non-catalytic stoves, those with EPA PM emissions below about 3.6 g/hr, would meet the Colorado CO standard.

The study also generated a graph plotting Colorado weighted CO emissions against the EPA weighted PM emissions. A correlation was evident between emissions of CO and PM for the non-catalytic stoves. Carbon monoxide emissions generally increased with rising PM emissions up to a maximum of about 300 g/hr for CO at a PM level of about 6 g/hr. The CO emissions then appear to decline with further increases in PM emissions, possibly because of a relationship between burn rate and PM emissions. Increased PM emissions may correspond to increased burn rates for the non-catalytic appliances. The higher firebox temperatures associated with higher burn rates generally lead to more efficient incineration of CO.

The CTC woodstove study resulted in a listing of residential woodstoves certified by the EPA as of November 8, 1989. The effort also produced Lotus worksheets to serve as working tables for catalytic and non-catalytic stoves.

a compilation of current emission factor data that State and local agencies may use in estimating emissions from iron foundries.

The CTC study sought to provide a comprehensive set of emission factors for sources of criteria and toxic air pollutants in gray and ductile iron foundries. The Center identified emission factors for process sources, process fugitive, and open source fugitive emissions. The emission factors are not specific to any one facility.

Studies over the past several years have focused chiefly on emissions of criteria pollutants. These pollutants include PM, sulfur dioxide, carbon dioxide, nitrogen oxide, VOCs, and lead. More recent work has focused on air toxic pollutants, which include many different compounds. The CTC report on iron foundries summarizes the data available for both types of pollutants, and serves as a guide for estimating the emissions when emission measurements are not available.

The CTC accomplished its study of emission factors for iron foundries by conducting a literature search of the library of the U.S. EPA and the American Foundrymen's Society. The CTC reviewed publications for information which could be used for developing emission factors for any of the processes associated with iron foundries. The resulting report presents emission factors in terms of an average value or range of values as well as a rating of quality or reliability.

"Emission Factors for Iron and Steel Sources—Criteria and Toxic Pollutants" (6)

In response to a request by EPA's Region 8, the CTC conducted a study to acquire a comprehensive set of emission factors for sources of both criteria and toxic air pollutants in integrated iron and steel plants and specialty electric arc shops. The study identified emission factors for process sources, process fugitive, and open source fugitive emissions. The CTC identified the literature source for each emission factor, the range of values found, and the recommended best value with its rating.

The study resulted in a recommendation to use published emission factors whenever possible. When published emission factors are not available, the study recommended using the emission factors developed for the 1985 National Acid Precipitation Assessment Program emissions inventory. The literature search conducted in the study also discovered older studies conducted primarily on uncontrolled sources.

The CTC study found only limited information on toxic air pollutant emission factors. The report suggested the toxic air pollutant emission factors reported in the "Toxic Air Pollutant Emission Factors - A Compilation for Selected Air Toxic Compounds and Sources" (EPA-450/2-90-011, PB90-126003) despite the limitations of that study. The CTC report concluded that additional work on quantifying the emissions of toxic air pollutants from the iron and steel industry would be helpful.

Estimate of Excess Benzene Emissions from Equipment Leaks

The CTC provided technical assistance to EPA Region 3 in estimating excess emissions from equipment leaks at a Chevron U.S.A., Inc. Philadelphia refinery. Region 3 was providing the estimate for a civil action in the U.S. District Court for the Eastern District of Pennsylvania. The U.S. had filed the action against Chevron U.S.A., Inc. claiming that the refinery had failed to implement an equipment leak detection program resulting in emissions of benzene into the environment.

Excess benzene emissions are not explicitly defined in the "National Emission Standard for Hazardous Air Pollutants," nor are they discussed in the notices of proposal or promulgation published in the "Federal Register." For the purposes of this evaluation, excess emissions were viewed as those emissions associated with components that continue to leak beyond the allowable 15-day period for

repair of the equipment, and for which sufficeint documentation for delay of repair has not been provided. Emission estimates were developed for those pieces of equipment for which repair was delayed, but for which documentation was unavailable or inadequate to justify delay of repair.

"Evaluations of Emission Control Devices at Waferboard Plants" (7)

In 1987 the CTC published a report in response to a request from the State of Colorado following complaints of eye and lung irritation from residents near a waferboard manufacturing plant. More recently, the State of Colorado requested additional CTC assistance in determining the effectiveness of control devices for emissions from wood chip dryers in waferboard plants. This report describes the general process of waferboard production, an analysis of the extractable organics in wood, and a characterization of wood chip dryer effluents. The report discusses aerosol formation, an evaluation of emission control options, and a review of available information on press vent emissions.

The study concluded that insufficient data are available to adequately characterize wood chip dryer effluents, because of the variety of factors affecting the composition of the effluents. The study further concluded that EFB's are more suited for controlling effluents generated from the drying of hardwoods and other low-resin-content woods. Wet ESP's are better than EFB's for the control of sticky, hydrocarbon-laden wood chip dryer effluent streams. However, wet ESP's have higher capital and operating costs that do EFB's. The study also identified three factors that affect formaldehyde emission from press vents: (1) the excess formaldehyde content of the resin, (b) the amount of resin used, and (c) the press temperature.

Characterization of emissions from wood chip dryers is difficult because of the limited data available. Wood species, dryer temperature, dryer loading rate, and previous drying history of the wood affect the composition of dryer effluents. An understanding of relationships between these factors and composition of wood chip dryer exhaust emissions would require comprehensive parametric test data that are currently unavailable.

"Evaluation of Emission Control Options at Leeds Architectural Products" (8)

The Connecticut Department of Environmental Protection (CTDEP) requested assistance from the CTC in evaluating alternatives for controlling VOC emissions from a specialty aluminum coating facility. The facility had presented a best available control technology (BACT) evaluation to the CTDEP stating that added emission control was not economically feasible. The CTDEP questioned the conclusion and requested an independent evaluation.

The CTC identified several broad options for reducing emission that it planned to investigate. The options were:

- Conventional VOC control devices to control the existing exhaust streams
- Conventional methods to reduce exhaust flow and treatment with conventional VOC control devices, and
- Novel or developmental methods of achieving more cost-effective emission control

The CTC, an EPA contractor, and CTDEP visited the facility to observe the operations and gather data for a technical and economic evaluation of control options. They concluded that controlling emissions would permit the facility to increase production, and that the revenues from the production

increase could help offset the added cost of the emission controls. The cost data provided in the report can also be used to estimate emission rates and costs of alternatives involving partial emission control.

"Evaluation of Emission Factors for Formaldehyde from Certain Wood Processing Operations" (9)

The CTC conducted a project to supplement an earlier CTC report, "Evaluation of Emission Factors for Formaldehyde from Certain Wood Processing Operations" (EPA-450/3-87-023, PB88-118492). The new study includes information that became available between October 1987 and May 1989. The focus of this effort was on existing data that would allow calculation of emission factors for four unit operations in wood veneer plants. The four operations are the formulation of the urea- and phenol-formaldehyde resin glues, the application of the glues, the curing operation, and storage of finished products.

The CTC sought information on formaldehyde emissions from wood veneer operations to develop emission factors for the industry. Formaldehyde releases of 246 kg (542 lb) were reported under Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) from a large plywood plant in Mississippi. However, existing data found during the study period were insufficient to allow reliable emission factors to be calculated.

Mandatory submittals of formaldehyde release estimates under SARA Title III and the California Air Toxic Hot Spot Act of 1987 should become available within the next few years. These data could be combined with available production statistics for the wood veneer industry to compile emission factors. More reliable data may become available from compliance tests that follow permit decisions in States that regulate formaldehyde emissions from wood veneer plants now and in the future. A comprehensive test program performed in several plants and unit operations would provide the highest quality, most useful data for emission factor development. This report discusses data sources and information gathering methodology and study results.

The CTC collected emission data for this study by conducting telephone surveys of regulatory personnel, industry contacts, and trade organization contacts. It also conducted a computerized literature search and a search of data bases containing air toxics emissions data. Those data bases included the National Air Toxics Information Clearinghouse (NATICH), recent supplements to the Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) Clearinghouse document, and estimates of 1987 releases of formaldehyde from plants provided to the EPA under Title III of SARA.

Formaldehyde emissions information from wood veneer operations found during the study period is insufficient to relate emission rate, production rate, and free formaldehyde content of the urea-formaldehyde resin used. Reliable factors could be developed from emission data collected during a test program designed to measure actual emissions, production rate, and percent free formaldehyde in the glue from several wood veneer unit operations at several plants. The number of plants and sources tested would determine the quality of the emission factors generated.

"Industrial Wastewater Volatile Organic Compound Emissions-Background Information for BACT/LAER Determinations"(10)

In response to requests by several States and EPA Regional Offices, the CTC prepared a technical guidance document for controlling air emissions from the collection and treatment of industrial wastewater. The document provides technical information on estimating emissions of VOC and BACT/LAER determinations for controlling the emissions. The document applies to the organic chemicals industry, plastics and synthetic fibers, pesticides, pharmaceuticals, and hazardous waste treatment, storage, and disposal. The document's application could be expanded to include additional industries as information becomes available.

The industries covered in this document have the potential to generate wastewaters containing high concentrations of organic compounds. These wastewaters typically pass through a series of collection and primary treatment units. They are then treated to reduce the concentration of organic compounds prior to discharge. Many of these collection and treatment units are open to the atmosphere and allow organic-containing wastewaters to contact ambient air. Atmospheric exposure of these organic-containing wastewaters results in significant volatilization of VOC from the wastewater.

The VOC emissions can be reduced by applying one of three control strategies. The most effective strategy is to apply waste minimization techniques to reduce the organic concentration of the wastewaters, or to produce a more manageable wastewater stream through waste segregation or recycling. Even with waste minimization, some waste streams will be generated. Emissions from these wastewater streams can be reduced by applying treatment at the point of generation. Numerous controls are suitable in specific cases. However, the most universally applicable technology for controlling emissions from wastewater generated by these industries is steam stripping. A third control strategy for some situations is to enclose the wastewater collection system and treat all processing units for removal or destruction of the organic compounds.

State and local agencies and EPA Regional offices may refer to this CTC document for a description of each industry covered in the report. The document enumerates the sources of organic containing wastewater, the sources of VOC air emissions, and available VOC emission control strategies. The report also includes the secondary impacts and control costs associated with the recommended control strategy, steam stripping.

"Powder Coatings Technology Update" (11)

The CTC provided a report summarizing the status of powder coating technology. Industries are using powder coating at an increasing frequency because of environmental concerns associated with solvent-based coatings, which cause VOC emissions. Recent improvements in powder coating technology have also contributed to the growing trend toward this coating method. The application of powder coatings, which are dry, finely divided particles, causes no release of VOCs. And the curing process associated with powder coating produces only minute amounts of VOCs. Air pollution control agencies are encouraging industrial finishing operations to use powder coatings as a means of reducing VOC emissions.

The CTC report on powder coating technology provides information on the performance, applicability, costs, and availability of powder coatings to assist State and local agencies in evaluating powder coating as an air pollution control technology. The CTC based its report on literature searches, contacts with several State and local air pollution control agencies, and written survey questionnaires to powder coating manufactures, users, and equipment suppliers. The report provides a brief history of powder coatings, the different classes of available powder coatings, and recently developed powder resins. The document also discusses the types of equipment required for a powder coating line and the types of products that are typically powder coated. And finally, the report presents the economic advantages of this technology and a cost comparison between powder and liquid coatings.

"Surface Impoundment Modeling System (SIMS) 2.0 Users' Manual" (12)

The CTC updated its software for use by State and local air pollution control agencies in preparing VOC and air toxics emission inventories. Together with the Technical Support Division of OAQPS the CTC developed SIMS, a menu-driven PC system. State and local agencies may employ SIMS to estimate emissions of organic compounds from impoundments at hazardous waste treatment, storage, and disposal facilities (TSDFs), publicly owned treatment works (POTWs), industrial wastewater treatment facilities, and other similar operations.

The OAQPS developed a set of emission models for sources including surface impoundments to estimate VOC emissions based on input parameters such as impoundment type and dimensions, influent flow rate, and inlet pollutant concentrations. The CTC incorporated these models into the SIMS software, which includes default values for use by State and local agency personnel who may not have information on all of the input parameters required by the models.

The SIMS program applies to flow-through and disposal impoundments and turbulent or quiescent flow. The program can also account for biodegradation when appropriate. The user must provide the type of impoundment, whether it is used for biological treatment, and the total flow into the impoundment. The user must also supply the total surface area of the impoundment and the type of industries discharging wastewater into the impoundment. The agency using SIMS may supply as much additional information as is available and use the program's default values as necessary.

Impoundments at facilities such as TSDFs, POTWs, and industrial wastewater treatment facilities may account for a significant amount of the total VOC or air toxic emissions in some areas of the U.S. SIMS provides State and local air pollution control agencies with a valuable tool in estimating these emissions. The CTC has expanded the compound data base in SIMS 2.0 and added models for diffused air systems and systems with an oil film layer for junction boxes, lift stations, sumps, and weirs. SIMS was also upgraded for application to multiple impoundment systems.

"Test Report: Method Development and Evaluation of Draft Protocol for Measurement of Condensible Particulate Emissions" (13)

The CTC responded to requests by several States and the State and Territorial Air Pollution Program Administrators (STAPPA) for a test method for condensible particulate matter (CPM). Because current methods measure only in-stack PM, EPA considered a CPM method to be vital. EPA made the impinger catch method of measuring CPM the subject of this study. This method allowed the determination of both filterable PM and CPM simultaneously, uses existing methodology and equipment, and is being used by several State agencies. The CTC published a report which details the laboratory and field evaluations of the study.

The evaluation sought to determine the adequacy of the test method and produce supporting documentation. A further objective was to revise the candidate method based on the results of the laboratory experiments, to validate the method in field tests, and to revise the method, if necessary.

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## APPENDIX B

## SUMMARIES OF CURRENT PROJECTS

### Estimate of Landfill Emissions

The CTC has received several HOTLINE requests for information on landfill emissions. The Center responded by producing a floppy disk and user's guide for estimating landfill emissions based on an existing model. The project is scheduled for completion in December 1990. (Susan Thorneloe, 919-541-2709)

### Investigation of Improved VOC Controls in the Graphic Arts Industry

The CTC is documenting volatile organic compound (VOC) control applications in graphic arts facilities using rotogravure or flexographic printing. The CTC gathered data during several plant visits, and is identifying sources using unique air flow management and capture techniques. The report will be complete in February 1991. (Karen Catlett, 919-541-0835)

### $NO_x$ Control Technology Data Source Book

The CTC is preparing a document to guide State and local agencies and EPA Regional Offices in reviewing permits for non-utility combustion sources. The CTC visited several key vendors in Europe to gather data. The report is scheduled for completion in May 1991. (Charlie Sedman, 919-541-7700)

### Vermont/Wood Waste Incineration

The State of Vermont requested CTC assistance after receiving complaints from citizens about odors coming from two plants that burn wood waste. The CTC conducted a preliminary study of wood waste combustion to determine if one of the Vermont plants is typical of the industry. The CTC will conduct a field test or simulated combustion to collect additional data. The results of the study may affect the State's regulations on incineration, which presently apply to combustion of wood waste. The project is scheduled for completion in May 1991. (Bob McCrillis, 919-541-2733)

### PERC Waste Test Method

The CTC received a request from EPA Region 1 for assistance in evaluating a test method for determining the perchloroethylene (PERC) content of wastes from dry cleaning facilities. The project is scheduled for completion by April 1991. (Tony Wayne, 919-541-3576)

### New Mexico/Mixed Waste Combustion

The State of New Mexico requested CTC support in developing rules for the combustion of mixed waste (contaminated by radioactive material). The CTC is assisting the State by evaluating alternative emission controls and monitoring devices at mixed waste combustors. The project is scheduled for completion in April 1991. (Bob Blaszczak, 919-541-5432)

Hazardous Air Pollutants Program (HAP-PRO)

The CTC is replacing "Controlling Air Toxics" (CAT) with new user-friendly software called HAP-PRO, based on the "Handbook: Control Technologies for Hazardous Air Pollutants" (the HAP Manual), EPA-625/6-86/014. The program will speed up and improve the reviewing of permit applications for control of air toxics. HAP-PRO is mouse-driven, includes pop-up menus, and enables access to data on several plants simultaneously. The program is scheduled for distribution in June 1991. (Carlos Núñez, 919-541-1156)

Colorado/Waferboard Press Vent Emissions

The CTC assisted the State of Colorado and EPA Region 8 in an in-depth engineering analysis of alternative methods for the control of condensible VOC emissions from waferboard press vents. Upon completion of the analysis, the CTC sent the State of Colorado a letter summarizing its findings. The project is scheduled for completion in March 1991. (Mike Kosusko, 919-541-2734)

Pennsylvania/Iron Oxide Process Analysis

The Pennsylvania Department of Environmental Resources requested CTC assistance in analyzing a substance that is deposited on cars, buildings, and other surfaces in the vicinity of an industrial plant. The plant produces iron oxide for use in the recording tape industry. The CTC is receiving monthly samples for x-ray diffraction and elemental analysis. The project is scheduled for completion in May 1991. (Frank Briden, 919-541-7808)

"Handbook: Control Technologies for Hazardous Air Pollutants" (HAP Manual) Update

The CTC is updating the HAP Manual (EPA-625/6-86/014), which provides assistance to State and local agencies and EPA Regional Offices in selecting, evaluating, and determining the cost of controls for hazardous air pollutants from commercial sources. The manual contains information for authorities reviewing permit applications and for individuals requesting information on HAP control systems. The manual is scheduled for completion in June 1991. (Carlos Núñez, 919-541-1156)

Ultraviolet Coating Technology

The Bay Area Air Quality Management District in California requested engineering assistance in researching ultraviolet curable coatings to reduce emissions of ozone precursors. A CTC report is scheduled for completion in June 1991. (Chuck Darvin, 919-541-7633)

Evaluation of Alternatives to Asphalt Roofing

The CTC conducted an evaluation of alternatives to asphalt roofing, which produces volatile organics and condensibles. The evaluation resulted in this project to determine air toxics emissions from hot asphalt roofing. The project is scheduled for completion in June 1991. (Bobby Daniel, 919-541-0908)

Electrostatic Precipitator (ESP) Models

The CTC, in conjunction with the Electric Power Research Institute, is developing two ESP models. One is a full-feature ESP model with in-depth analysis capability for use by scientists and engineers. The other model will be "user-friendly," primarily for use by State and local agencies. The two ESP models will be complete in May 1991. (Norman Plaks, 919-541-3084)

Maryland/Yeast Manufacturing

The Maryland Department of the Environment requested a CTC study of VOC emissions from the manufacture of baker's yeast and available control technologies. The initial phase of the project evaluated the source category, its potential emissions, and identified its impact on ozone non-attainment. Phase II will consider alternative controls and their costs and impacts. The project is scheduled for completion in June 1991. (Martha Smith, 919-541-2421)

Tire Burning—Additional Analyses

The CTC is conducting further analyses as a follow-up to its earlier study to estimate emissions from the open burning of scrap tires. The follow-up will be an evaluation of the biological activity in the results of the original tire burning study. The study is scheduled for completion in October 1991. (Paul Lemieux, 919-541-0962)

Virginia/Fluff Combustion

The Virginia Department of Air Pollution Control requested CTC assistance in identifying emissions from the open burning of non-metallic automobile components known as "fluff." The CTC will obtain fluff samples and analyze samples from simulated burns. The project is scheduled for completion in October 1991. (Paul Lemieux, 919-541-0962)

## TECHNICAL REPORT DATA
*(Please read Instructions on the reverse before completing)*

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15. SUPPLEMENTARY NOTES AEERL project officer is C. H. Darvin, Mail Drop 61, 919/541-7633. R. J. Blaszczak is with EPA's Office of Air Quality Planning and Standards, Mail Drop 13, Durham, NC 27711, 919/541-5432.

16. ABSTRACT The report discusses services provided by EPA's Control Technology Center (CTC) during FY90. The CTC, developed by EPA's Office of Research and Development (ORD) and Office of Air Planning Quality and Standards (OAQPS), is an innovative technical assistance program for state and local air pollution agencies and EPA's regional offices. Since the CTC's inception, its program has expanded to address more than just air toxics issues. It now addresses emission source and control technology problems associated with air toxics, particulate matter, oxides of sulfur and nitrogen, carbon monoxide, lead, PM10, and volatile organic compounds. The CTC is designed to be flexible so that it can respond quickly to many client needs as they arise. The CTC provides three categories of services: telephone HOTLINE assistance (919/541-0800), direct engineering assistance, and technical guidance. The HOTLINE permits easy access for state and local agencies to EPA personnel who can provide prompt assistance in a variety of ways, including consultations, references to pertinent literature, and access to EPA technical data and analyses. Direct engineering assistance is short-term, averaging about 3 months and providing technical assistance without regard to national utility. Technical guidance is longer term, up to a year, broader in scope, and with national applications.

17. KEY WORDS AND DOCUMENT ANALYSIS

| a. DESCRIPTORS | | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group | |
|---|---|---|---|---|
| Pollution | Organic Compounds | Pollution Control | 13B | 07C |
| Emission | Volatility | Stationary Sources | 14G | 20M |
| Toxicity | Sulfur Oxides | Control Technology Center (CTC) | 06T | 07B |
| Information Centers | Nitrogen Oxides | | 05B | |
| Environmental Engineering | Carbon Monoxide | Particulate | | |
| | Lead (Metal) | PM10 | 05E | |
| Particles | | Volatile Organics | | |

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