



## EDUCATION, PUBLICATION, COMMUNICATION, AND COMMERCIALIZATION

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### ***Project Description***

This ongoing project continues to provide technical information on trace metals produced through the CATM Program to interested parties in research organizations, federal and state agencies, and the energy and environmental industry as well as to encourage and support activities that provide training and educational opportunities for both students and professionals.

Since its inception in 1993, the CATM Program has strived to improve on and provide educational courses and materials that make students and the public more aware of environmental issues and serve as reference documents to the scientific community [1–10]. With respect to education, the goals of the CATM Program are consistent with the U.S. Environmental Protection Agency’s (EPA) goals, which state that “Increased information exchange between scientists, public health officials, businesses, citizens, and all levels of government will foster greater knowledge about the environment and what can be done to protect it” [11, 12]. Additionally, CATM strives to develop and demonstrate products and technologies that aid in pollution prevention and/or control and works with partners to commercialize these technologies in the marketplace. To ensure that these goals, as well as the overall goals of CATM, are met, EPA has conducted on-site peer review of the CATM Program. The outcome of these reviews have been very positive, with the most recent review complimenting CATM as “one of EPA’s best centers” [13].

### ***Goal***

Specific goals are as follows:

- Prepare, publish, and present CATM results at conferences and workshops and in peer-reviewed journals and conference proceedings.
- Provide educational opportunities for students through CATM research.
- Promote technology development and commercialization.

### ***Rationale***

Because of increasing environmental concerns, training, education, and dissemination of up-to-date information to industry and government agencies (e.g., EPA and the U.S. Department of Energy [DOE]) in a timely manner are critical. Sharing with and transferring the latest research findings to industry, environmental groups, state agencies, and EPA will greatly assist in establishing scientifically based regulatory standards.

### ***Approach***

To facilitate the transfer of information to government, research organizations, academia, industry, and the general public, several vehicles of communication are necessary. These activities generally included 1) coordination of the CATM annual meeting in conjunction with EPA, program affiliates, and the Research Advisory Council (RAC); 2) coordination and sponsorship of the Air Quality IV: Mercury, Trace Elements, and Particulate Matter (AQIV) Conference; 3) distribution of the *CATM Newsletter*; 4) updating and maintaining the CATM Web page; 5) serving on environmental advisory committees; 6) education through publications; and 7) overall administration of the CATM Program.

### ***Progress***

#### **Meetings**

The tenth annual CATM RAC meeting was held at the Marriott Crystal Gateway Hotel in Arlington, Virginia, September 24, 2003, in conjunction with the AQIV Conference. The purpose of the meeting was to provide a forum by which industry, government, and the research community could exchange information on CATM results and provide direction for future CATM research, development, and commercialization programs. Over 20 people participated, representing government (including EPA and DOE), industry, and other research organizations.

#### **AQIV Conference**

Endorsed by the North Dakota congressional delegation and the U.S. Secretary of Energy Spencer Abraham, the AQIV Conference, held September 22–24, 2003, is the world's premier conference for reviewing the current state of science and policy for mercury, trace elements, and particulate matter (PM) in the environment.

Mercury and airborne PM are two air pollutants that continue to receive much attention and be of great concern. AQIV reviewed the current state of science and policy on airborne pollutants, mainly from utility power generation, with a focus on mercury and PM emissions. Science, government, and business representatives met, discussed, and developed proactive responses to breakthroughs, questions, and concerns involving air quality. The conference provided a forum for industry, government, and research organizations to collectively discuss the environmental performance of the nation's future energy infrastructure.

More than 70 speakers from around the world presented papers covering two streams of topics: mercury and trace elements and PM. The conference also included a poster session featuring more than 20 presenters and 15 exhibitors representing utilities and vendors worldwide.

Highlights of the conference included:

- Opening keynote addresses by U.S. Senator Byron Dorgan (D-ND) and Jeffrey Holmstead, Assistant Administrator for Air & Radiation for EPA.

- The opening panel of five internationally renowned business, environmental, science, and government experts who debated the environmental policy surrounding airborne pollutants.
- Luncheon keynote addresses by Rita Bajura, Director of DOE's National Energy Technology Laboratory (NETL), and Representative Earl Pomeroy (D-ND).
- An evening banquet presentation by Senator Kent Conrad (D-ND).
- A special appearance by Clay Jenkinson, who provided, in character, Thomas Jefferson's views on air quality and the environment.
- Three preconference workshops given by Energy & Environmental Research Center (EERC) researchers were held on September 21, 2003.

More than 350 people from 39 states, the District of Columbia, and ten countries attended AQIV. EPA had 21 participants at the conference, demonstrating the conference's importance in providing timely and cutting-edge information for future regulations. Below are examples of the responses received from the evaluation distributed at the conference:

- "Another stimulating conference addressing today's most pressing air quality issues." – Dan Battleson, MSE – Technology Applications
- "This has been a class act showing the best can be done! Outstanding conference." – Paul Groble, Department of Environment and Natural Resources
- "This conference is by far the best I have attended as a professional. It provided important information to be used in performing my job duties. I look forward to attending this conference in the future. Keep up the good work!" – Daniel Adams, WE Energies/Wisconsin Energy Corporation

#### **CATM Newsletter**

Two issues of the *CATM Newsletter* were published and distributed to industry and other interested parties. The newsletter is circulated in all 50 U.S. states and to 36 countries internationally. The newsletter is designed to inform interested parties on air toxic issues and CATM activities and to encourage further participation and collaboration among industry and government. Upcoming issues of the newsletter will feature articles on AQIV. The newsletter is also available on the EERC's home page at [www.undeerc.org](http://www.undeerc.org).

#### **CATM Web Page**

The CATM Web page continues to serve as a vehicle for easy access to recent developments and results from the CATM Program. General information about CATM is also maintained and includes background; role and activities; accomplishments; key education and training activities: conferences, short courses, workshops, and academic programs; and CATM personnel.

#### **Committees**

CATM researchers and managers continue to serve on several advisory committees to provide expert advice and technical guidance on a number of issues related to air toxics. Below are a few of the committees that CATM researchers serve on:

- Binational Strategy Utility Mercury Reduction Committee
- North Dakota Mercury Task Force

### **Education Through Publications**

CATM strives to disseminate information in several ways. In the current year, 26 refereed journal articles have been published or are in preparation. Included is a comprehensive review paper on mercury emission and control for coal-fired power plants from all leading sources. This paper, "Status Review of Mercury Control Options for Coal-Fired Power Plants," was published in a special issue of *Fuel Processing Technology* in August 2003. CATM has also been involved in the writing of several related project reports. CATM staff members also give presentations at and participate in several conferences and workshops throughout the year. In the past year, CATM has presented 26 papers at conferences and workshops around the world. In addition to attending workshops and conferences, CATM is also organizing and coordinating the Air Quality V (AQV) Conference for September 2005.

### **Status**

Educational and information-sharing activities will continue throughout the year. Involvement in community environmental activities will continue, as well as the programs in place to reach out to and help area schools in their efforts to educate students and teachers on energy and environmental issues.

The newsletters and the CATM Web site have also become valuable outlets for disseminating information, and both will continue to provide valuable, up-to-date information.

### **Scientific and Institutional Peer Review**

On April 23–25, 2003, the EERC was visited for the purpose of conducting a scientific and institutional review of the CATM Program. The 3-day review was conducted by an external peer review committee on behalf of EPA's Office of Research and Development. The peer review panel noted that CATM has a number of strengths and important technical achievements and provided suggestions on how to further improve and grow the CATM Program. The following statements were provided by the peer review panel:

- "Overall, the Center appears to be among the best of those funded by EPA."
- "The CATM research program has clearly distinguished itself in the areas of combustion engineering and chemistry, particularly as it pertains to mercury, and in the estimation of this Panel, they currently are viewed as world leaders in this field of study."
- "The CATM–EERC interaction is well established. The individual research personnel appear to be well qualified and communicate well with each other and with the outside technical community."
- "Although the focus is almost entirely on mercury, the overall goals of the Center are well thought out and well integrated. There also is a good balance between more basic science and engineering studies."

On a continual basis, we strive to improve and grow the CATM Program and appreciate the suggestions provided by the peer review panel. Specifically, we will incorporate, over the course of the next few years, many of the suggestions provided by the panel, which should further strengthen CATM.

### **Air Quality V**

Continuing discussion on technology advancement and whether appropriate cost-effective technologies are available to meet suggested emission reductions is necessary at this time, leading to the need for a fifth Air Quality Conference. The EERC, along with EPA through CATM, DOE NETL, and EPRI, are collaboratively organizing and sponsoring AQV. This conference will be a follow-up to the first four Air Quality Conferences held in December 1998, September 2000, September 2002, and September 2003. AQV will take place in September 2005 at the Marriott Crystal Gateway, Arlington, Virginia.

The intent of this conference is to provide the opportunity for representatives from industry, environmental groups, the research community, and state and federal governments to present and discuss critical issues facing our nation and the world. Conference participants will gain up-to-date information and benefit from discussions on potential health risks, available and developing control technologies, control strategies and research needs, and current and pending regulatory policies.

### ***Quality Assurance/Quality Control***

The EERC is committed to delivering consistent, high-quality research. An organizationwide quality management system (QMS), authorized and supported by EERC managers, is in effect and governs all programs within the organization. The EERC established and formalized a QMS in August 1988. A quality manual defines the requirements and the organizational responsibilities for each major element of the QMS and references the supporting documents needed to provide a comprehensive program. Compliance with this manual and its supporting documents ensures that the EERC adequately fulfills governmental and private client requirements relating to quality and compliance with applicable regulations, codes, and protocols. Additionally, the CATM Program at the EERC has a quality assurance (QA) plan in effect that addresses trace metal research [14]. The CATM QA plan has been reviewed and accepted by EPA. The project reported on herein has complied with the quality manual, the CATM QA plan, and all revisions. An independent QA auditor has reviewed all aspects of QA/quality control associated with this project and report.

### ***Potential Users/Technology Transfer***

Industry and government agencies (specifically EPA and DOE) will benefit from the results of the project, with information and data that will provide a much better understanding of air toxic issues and the control of air toxic emissions. The general public will benefit through the publication of refereed papers and documents, college courses, workshops, and numerous outreach programs initiated and supported by CATM.

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