Emissions Factor Program Re-Engineering Update

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ABSTRACT

The Measurement Policy Group (MPG) assumed responsibility for implementing activities designed to update the emissions factor program. MPG is continuing to enact a three-part strategy to address emissions factor program stakeholder concerns. That strategy includes developing an electronic reporting tool (ERT), creating an interactive internet-based website for emissions factors (WebFIRE), and determining what uncertainties are associated with emissions factors, and, in the future, how these uncertainties could be used to provide better information to decision makers. The ERT establishes a standardized electronic format for supplying quality assured emissions test data. Using such a format, data can be uniformly assessed for quality assurance and can be readily shared after initial input. WebFIRE will collect, screen, and adapt never-before-captured emissions data with existing data for a specific source category at a particular site to ensure stakeholder concerns are met. In addition, an analysis and report on determining the uncertainty of highly-rated emissions factors has been prepared and will soon be available for review by the public. Results from that report may yield information suitable for use in determining how to apply the uncertainty associated with emissions factors. This paper describes the current status of the three-part strategy.

INTRODUCTION

In 2003, the Emissions Factor and Policy Applications Group (EFPAG), within the Emissions Monitoring and Analysis Division of the United States Environmental Protection Agency's (EPA's) Office of Air Quality Planning and Standards (OAQPS), committed to becoming more transparent, shifting to better monitoring approaches, and fostering new partnerships. As part of the second commitment, EFPAG resolved to re-evaluate and re-engineer, as necessary, the emissions factor program. EFPAG focused on:

- Identifying ways to make the program more responsive to the broad and diverse range of the users of emissions factors;
- Identifying methods that would expand the capabilities for improving the number and quantity of available emissions factors;
- Identifying and implementing ways to improve and speed up the emissions factors development process;
- Characterizing the deficiencies of using emissions factors by quantifying the uncertainties associated with their various uses; and
- Providing users with options for quantifying emissions, reducing the levels of uncertainty to meet program goals, and increasing accountability.

During the re-evaluation, EFPAG found that it has a greater emphasis on in-house emissions factor development, as opposed to managing or easing the process for outside emissions factor development. A few modest improvements, such as implementing electronic access for emissions factors, had been provided. Most of the guidance concerning use of emissions factors had been created for national emissions inventory development purposes. Finally, while needs for emissions factors had increased, resources for developing new emissions factors decreased.

One important component of the re-evaluation process involved interviewing emissions factors stakeholders. While conducting those interviews, staff meet with stakeholders who depend on the

emissions factors program and to learn the program, finding out how emissions factors are used and can be misused, what was – and was not – working, and determining needs. From that exercise, stakeholders said that the Agency appeared to have disinvested from the emissions factors program; that data from source testing are not submitted to the Agency – or, if they are submitted, they do not get into AP-42; that emissions factors are being misused; and that emissions factors and the associated information are sometimes difficult to find.

In addition, stakeholders said that there are many sources with few emissions factors, or with emissions factors of unknown quality, or with no emissions factors. They also reported that AP-42 is not the sole source for emissions factors; that emissions factors may need to be region specific; and that it takes too long to develop emissions factors. A quick characterization of stakeholder comments would include these points:

- There are not enough emissions factors;
- It takes too long to get emissions factors into AP-42; and
- Emissions factors may not be accurate for site specific, non-emissions inventory purposes.

Given these comments, EFPAG developed a number of options to address the concerns, convened four workshops to learn from stakeholders what options best met their real and perceived program demands, learned what the level of support existed for the options, and received prioritization for the tasks. In addition, EPA should identify stakeholders to collaborate with in developing and revising emissions factors.

During the workshops, one of which was held during the 2004 Emission Inventory Conference, state and local agencies and others recommended developing means of conveying emissions test data electronically, characterizing the uncertainty of emissions test data and factors, developing guidance for non-emissions inventory applications, allowing use of existing industry-developed information, and streamlining the approval process. State and local agencies and others also suggested improving information transfer and sharing, standardizing testing and emissions factor development procedures, improving information collected during source tests, and making the development process small business friendly.

Based on those observations, recommendations, and suggestions, EFPAG decided on a three-prong strategy to revamp the emissions factor program. The first product involves developing an electronic reporting tool (ERT) to make it easier for State, Local, and Tribal environmental agencies to accept, assess the quality, and transmit emissions test data. The second product is an upgrade to the factors information retrieval (FIRE) system, making it an interactive, real-time internet application, renamed WebFIRE. The third product concerns developing a means to quantify the uncertainty associated with using emissions factors and sharing that information with users.

Three significant events have occurred since initiation of emissions factor program re-engineering: the reorganization of OAQPS, the release of an assessment of the current state of emissions inventories by the North American Research Strategy for Tropospheric Ozone (NARSTO) organization, and an internal Inspector General review of the program. As part of the recent OAQPS reorganization, the number of staff remaining on the project have been reduced, the staff and the responsibilities for the RACT/BACT/LAER Clearinghouse have been added to the group, the group's name changed from EFPAG to the Measurement Policy Group (MPG) to better reflect the new mission, and the group transferred from the Emissions Monitoring and Analysis Division to the newly-formed Sector Policies and Programs Division. Even with the reduction in staff and accretion of additional duties, division management remains committed to the re-engineering effort. The NARSTO assessment identified significant weaknesses or shortcomings in emissions inventories that will become increasingly

important for future air quality management problems. With respect to the stationary and area source categories, weaknesses were identified in the areas of:

1) Quality assurance and quality control procedures,
2) Documentation of uncertainties and data sources,
3) Inadequately characterized emissions for many important categories (fine particulate matter (PM), PM precursors, toxic air pollutants, etc.),
4) Emissions estimates based upon few non-representative source measurements and poor temporal and spatial resolution of emissions, and
5) Out of date emissions estimating methods.

The Inspector General sought to find out if emissions factors are of acceptable quality for making key environmental decisions, recognizing that emissions factors are used for purposes other than the national emissions inventory. The Inspector General also reviewed the program to see if the process for developing, improving, and rating emissions factors is sufficient to meet users' needs. The Inspector General released a report of his recommendations for the program in March that mirrors much of our re-engineering activities. The report suggests we prepare guidance to address development and appropriate use of emissions factors for non-inventory purposes, establish a rating system that provides an uncertainty range for both inventory and non-inventory uses, work with others to leverage resources to get new factors, and develop a comprehensive strategic plan. Our response to these suggestions and other recommendations will be developed after the deadline for submission of this paper.

RE-ENGINEERING UPDATE

Electronic Reporting Tool (ERT)

The Electronic Reporting Tool (ERT) is a Microsoft Access desktop application that provides an electronic alternative for manual creation of paper records and reports documenting adherence to EPA's emissions measurement Methods 1 through 5 and Method 202 for stationary sources. The ERT offers a resource reducing and standardized alternative to the time-intensive manual preparation and transcription of stationary source emissions test plans and reports currently performed by emissions testing contractors for emissions sources and the time-intensive manual quality assurance evaluations and documentation performed by State agencies. Eventually, we hope the ERT will reduce use of, if not replace, manual techniques. The ERT provides a format that:

- Highlights the need to document the key information and procedures required by the existing EPA Federal Test Methods;
- Facilitates coordination among the source, the emissions testing contractor, and the regulatory agency in planning and preparing for the emissions test;
- Provides for consistent criteria to quantitatively characterize the quality of the data collected during the emissions test;
- Standardizes the reports; and
- Provides for future capabilities to electronically exchange information in the reports with facility, Local, State, Tribal or Federal data systems.

In addition to improving the content and quality of source emissions test reports, the ERT should reduce the workload associated with manual transcription of information and data contained in the emissions test report, the resources required to store and access the reports; and redundant efforts in using the data by multiple programs with multiple goals. Future versions of the ERT will provide for electronic preparation and data transfer from other EPA and State test methods. The current version of the ERT is available for review and comment at <http://www.epa.gov/ttn/chief/ert/ert_tool.html>. While the ERT is a final product for the traditional applications of those source test methods for which it

is applicable, it provides a basis for a larger number of other EPA and State test methods and expansion / enhancement for use in other applications.

The ERT's three parts include: the Application; the Project Data Set (PDS); and an Excel Spreadsheet. The Application part contains all the screens, reports, calculations and other items necessary to create and distribute the Test Plan and Test Report.

The PDS is also a Microsoft Access Database that contains the Test Plan and Test Report Data. This is the file that will be exchanged between the source test contractor, the client and the State Agency. Each PDS contains information for one test report. When the ERT is started initially, you are prompted to name the PDS that is created automatically in a "Project Data" directory by the ERT. Thereafter, the last PDS used is remembered by the ERT when restarted. There is no limit on the number of PDS files but only one PDS can be opened at a time.

The Excel Spreadsheet can be used in the field (or office) to enter the run information. While the spreadsheet functions like most field data collection spreadsheet applications, many groups of cells have been named to exporting critical data. The ERT has the ability to import this critical data from this spreadsheet into the selected PDS. To use the ERT, you must use this spreadsheet file, transcribe the critical data manually or create the appropriate links in your proprietary spreadsheet.

The basic work flow using the ERT is envisioned as follows:

1. Create the Test Plan
2. Print and attach draft Test Plan into PDS (optional)
3. Submit (via PDS file) the Test Plan to the Agency
4. Await Agency approval or return (via PDS file) for revisions
5. Revise and re-submit (via PDS file) the Test Plan to the Agency
6. Enter field data into the ERT Excel Spreadsheet
7. Enter test and process data into the ERT PDS file
8. Attach supporting documentation
9. Submit PDS file to the Agency
10. Conduct Agency review of PDS file.

An independent contractor has challenged the ERT and appropriate revisions are being implemented to make it easier to use. Through the use of the ERT, all new source test data used for emissions factors development will include a quantitative assessment of uncertainty. We expect emissions testing contractors will maintain or improve their techniques, as source owners or operators become aware of those contractors whose reports document improved precision and accuracy.

WebFIRE

WebFIRE is an internet based Cold Fusion application that combines AP-42, the *Compilation of Air Pollutant Emission Factors*, and FIRE, the Factor Information Retrieval Data System. FIRE is used by local, state, and federal agencies, environmental consultants and others who require emissions factor information for estimating criteria pollutants and air toxic emissions from stationary sources. FIRE currently exists as a database containing EPA's emission estimation factors for criteria and hazardous air pollutants in a Windows program. Once FIRE is downloaded and installed on a local desktop personal computer, users can browse through records in the database or select specific emission factors by source category, source classification code (SCC), pollutant name, CAS number, or control device. FIRE version 6.25 contains emission factors from:

- All AP-42 sections posted by September 1, 2004,
- The *Locating and Estimating (L&E)* series of documents, and

- The retired AFSEF and XATEF databases.

All EPA Source Classification Codes (SCC) through September 1, 2004 are in the FIRE database. Version 6.25 supersedes all previous versions of the FIRE program. The program was first developed for EPA in the early 1990's and combined information from several different document and database sources. The program has been updated annually by an outside contractor. For the past two years, it was also released as a Microsoft Access database.

The website that consolidates the AP-42 and FIRE databases is located at http://www.epa.gov/ttn/chief/efpac/index.html. Consolidation to a web application using ColdFusion allows the database to be updated more frequently, keeping pace with updates to AP-42 as well as allowing for the addition of new source category codes (SCCs) and emissions factors for use in the EPA's National Emission Inventories. In addition to replacing the traditional report format of AP-42, the supporting background documentation, separate source characterization code tables and the compiled FIRE program, consolidating emissions factors into one internet based application will enable the Agency to update, revise, and revoke emission factors on a more real time basis rather than updating factors annually.

The next phase of WebFIRE implementation involves laying the groundwork to implement changes recommended by the stakeholders. MPG will enhance WebFIRE by adding emissions factor source test reports and supporting background reports to the database. This information currently exists in a number of formats and locations, and its inclusion will further facilitate the ability of a user to check and verify independently the accuracy of emissions factors. With this new linkage between emission test reports and emissions factors, WebFIRE will gain the ability to calculate emissions factors on the fly, thus allowing for more accurate and current emission factors. Finally, these revisions will allow WebFIRE to incorporate emission test results for the ERT and to calculate and present uncertainties associated with emissions factors.

Emissions Factor Uncertainty Assessment

As will be explained in a subsequent paper at this conference, MPG had its contractor, Research Triangle International (RTI), conduct a study of the uncertainty associated with certain existing highly-rated emissions factors and analyze the results to determine what, if any, patterns based on characteristics such as source category, pollutant, number of emissions tests and control device were discernable. Statistical data were collected and generated around forty sets of emissions data that yielded 'A' rated factors. That analysis and report have been subjected to a peer review process, and the report language is being clarified in the non-technical summaries. By early summer, the analysis and report will be made available on the EFPAC website for external review and comment.

Once those comments are received, reviewed, and incorporated, MPG may be able to better assess the quality of existing emissions factors and to begin the guidance development process to account for emissions factor uncertainty. By fall, MPG expects to begin internal management informational briefings concerning project findings, along with a number of policy options for expressing uncertainties. As part of any guidance development that could occur as a result of the briefings, MPG would expect to continue its dialogue with stakeholders to fashion a sensible approach to accounting for the uncertainty inherent in using emissions factors.

CONCLUSIONS

Building on the success of the former Emissions Factors and Policy Applications Group, the Measurement Policy Group (MPG) continues to implement the emissions factor program re-engineering

goals of making emissions factor development faster, increasing the number of emissions factors, and accounting for uncertainty in emissions factors.

Before the fall, we expect to have developed and tested a new emissions factor streamlining process and developed emissions factors for coke ovens, landfills, municipal waste combustors, steel mini-mills, landing losses for external floating roofs, and low pressure petroleum storage tanks. Working with other groups – consistent with our long-term goal of using others' resources to improve emissions factors – we will initiate development of emissions factors for natural gas engines, rubber manufacturers, and animal feeding operations.

As the Inspector General's report noted, it may take several years before re-engineering to improve the program is complete. Provided sufficient resources to complete this effort continue, MPG looks forward to full implementation of these activities and others that enable better means of emissions quantification.

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KEY WORDS

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WebFIRE
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