2008 EPA Conference on
MANAGING ENVIRONMENTAL QUALITY SYSTEMS

Seattle, Washington • April 21-24, 2008

Sharing **Information** to Spur **Innovation**

Abstracts

TABLE OF CONTENTS

Please reference the session you are interested in below. The page number for the abstract will be listed after the title.

Development of a Consensus Standard for Quality Systems in Environmental Testing Laboratories

Robert P. Di Rienzo
DataChem Laboratories, Inc.

The NELAC Institute (TNI) has developed and approved a consensus quality systems standard for use by environmental testing laboratories. The standard is based on ISO 17025:2005, NELAC 2003 Chapter 5 and DoD QSM. This session will first focus on the standard development process including committee structures and activities needed to develop the standards.

TNI has a policy on standards development that has been reviewed by ANSI with final action pending resolution of ANSI comments. This session will describe the policy on development of standards used by TNI and outline the consensus process which includes open meetings, participation by stakeholders and addressing stakeholder comments.

The third part of this presentation will describe the structure of this new consensus standard, additional elements from ISO 17025:2005, and changes from NELAC 2003 Chapter 5. This new standard starts with a general requirements module which outlines the management system requirements for all environmental testing laboratories. The standard then includes modules for technical areas, Asbestos, Chemistry, Microbiology, Radiochemistry and Toxicity, and additional modules can be added addressing new technologies, new programs (Drinking Water or Homeland Security) and possibly contract compliance (DoD, Superfund or DOE).

Alternative Approaches to Collecting and Interpreting Matrix Spike Data

Harry B. McCarty, Lynn S. Walters, and Judith A. Schofield
Statistical Applications and Data Assessment Team, CSC

One hallmark of data of "known quality" is an assessment of the bias and precision of the measurement process. Although there are several ways in which such an assessment can be made, the most common one utilized in methods approved by EPA for environmental monitoring is the preparation and analysis of field samples spiked with the analytes of interest. "Matrix spike" samples have been incorporated into many EPA programs and methods since the 1970s. Although different programs may use different names for these spiked samples, three aspects have remained largely the same for over 30 years: the frequency at which spiked samples are to be analyzed, the equation used to calculate the recovery of the spiked analytes, and difficulties in choosing spiking levels that will provide useful information on method performance. The most commonly used frequency for preparing spiked samples is 5%, (1 in 20 samples of the same type), and it provides the needed data at a reasonable cost. A common form of the equation is:

$$\%R = \frac{X_s - X_u}{K} \times 100$$

where:
%R = percent recovery of the spiked analyte
X_s = measured value for spiked sample
X_u = measured value for unspiked sample
K = known value for the spike in the sample

The equation assumes that the background concentrations in the unspiked sample and the aliquot that is spiked are identical. However, when the parent sample is not homogeneous, particularly in the case of solid matrices, that assumption can result in negative recovery values – a physical impossibility that violates the law of conservation of mass. Using the same results for unspiked and spiked samples, and spiking amount, we have demonstrated that a simple rearrangement of the terms of the equation eliminates the possibility of negative values and allows a more meaningful interpretation of the results. The alternative equation is:

$$\%R = \frac{X_s}{X_u + K} \times 100$$

Even using the alternative equation, the utility of the matrix spike is wholly dependant on the spiking concentration. Without knowledge of the site or process, laboratories may spike the samples at concentrations too low to be noticeable when added to the background level in the sample. The obvious solution is to prepare and analyze the unspiked sample first, then choose an appropriate spiking level. However, that sensible approach often runs afoul of the assumption that the spiked sample must be prepared in the same batch as the associated field samples. We propose a simple decoupling of the spiked sample from the batch frequency and preparing the spiked samples after the results for the unspiked sample are known. Both these changes require a change in thinking by laboratories and their clients, but can significantly increase the value of these common QC samples at no additional cost, especially for large or long-term projects.

Data Verification - It's Not Just the Laboratory

Jack Bennett
Connecticut Department of Public Health

Many regulatory programs rely on laboratory generated analytical data for determining compliance with environmental regulations or for making decisions about the effects of contaminants on the environment. These end users of laboratory data often assume that because a laboratory is certified, all data generated by the laboratory is valid. This paper will point out why that assumption is not always valid, and some things that programs and other data users can do to ensure that the data they use is of a known quality.

Quality Assurance of Performance Measures

Ron Shafer and Patricia Mundy
U.S. EPA, Office of Environmental Information, Quality Staff

Judy Lieberman
U.S. EPA, Office of the Chief Financial Officer; Office of Planning, Analysis and Accountability

Performance measures are part of the agency's required report to the Office of Management and Budget. This session will discuss the quality aspects of the submissions from the perspective of the Office of the Chief Financial Officer that manages the process and the Quality Staff, which oversees environmental data quality for the Agency as it produces the data used to measure performance. Presenters will explain the processes used by the agency to ensure quality of the submission, and illustrate with examples.

Integrating the System of Registries (SOR) into Your Quality Program

Cindy Dickinson
U.S. EPA OEI, Office of Information Collection

John Tooley
State of Washington Department of Ecology

Burdell Schwartz
CGI Federal

Background
Major enhancements to the U. S. EPA System of Registries are underway to allow customers to improve the quality of data and information within their systems and information products. New commercial metadata (data about data) software, automated services, and support for data stewardship are broadening the usability and sphere of registries. The new registries greatly enable the tracking and implementation of data standards across EPA and improve the ability to manage standard code sets and pick lists. Reusable software components can be documented and implemented in multiple systems thus encouraging common business processes. It is hoped that the session will enable quality managers to promote registry services within their quality programs. The Office of Information Collection also seeks feedback for continuous improvement of the registries.

Session Content
This session will share and discuss with participants the status of the System of Registries enhancements, the vision for services, and the relationship to the development and implementation of data standards across U. S. EPA. Use of registry services to improve the quality of data and information will be approached from the system developer/manager perspective as well as the end user viewpoint.

- Enterprise Architecture Services (including System Inventory and Data Dictionary Management Services)
- Code Set Management Services
- Data Standards Services

- Terminology Services
- Reusable Component Services

Analyzing the Ozone and PM10 Data Gathered at the Monitoring Stations Located on the US-Mexico Border

Pepi Lacayo
U.S. EPA, Washington DC

Thomas Forbes
U.S. EPA, Washington DC

Nagaraj Neerchal
University of Maryland Baltimore County, Baltimore, MD

This is an interim report on the ongoing US - Mexico Border 2012 Project. Specifically, this report provide a study on the yearly average measurements of O3 and PM10 in selected Mexico-US Border areas (San Diego/Tijuana, Imperial Valley, Nogales/Nogales, Ciudad Juarez/El Paso, Brownsville/Laredo) for the years 1999 to 2006. Previous results in the Border project were reported by aggregating the measurements by region. (See Border 2012: US Mexico Environmental Program *Indicators Report 2005*) In this report we take a more in-depth look at the data from a time series point of view. The data are disaggregated as follows. First, yearly averages for O3 and PM10 are calculated and compared separately for US and Mexican land areas. Next, in order to associate O3 and PM10 more closely with geographical location, yearly averages for O3 and PM10 are calculated for each of the sites in the Border regions of interest. We investigate time and spatial variations of the various sites that may have been obscured by data aggregation. Also observed are significant differences in the PM10 levels between US and Mexico sites, and unusually high levels of O3 in certain sites located in the US.

Development of Quality Control Parameters and Electronic Data Recording for an Ambient Air Particle Inhalation Exposure System

Leon Walsh
Experimental Toxicology Division, National Health and Environmental Effects Research Laboratory, ORD, U.S. EPA, Research Triangle Park, NC 27709

Ambient air particle concentrating systems were installed by the U.S. EPA in RTP, NC. These systems, designed by Harvard School of Public Health's Department of Environmental Sciences and Engineering (Boston, MA), concentrated ambient fine and ultra-fine mode particulate matter (PM), in real time, for use as test agents in 13-week, sub-chronic animal inhalation exposure studies. The systems consisted of PM size fractionating and concentrating equipment, chambers for each aerosol mode and controls, plus system and particle monitoring and data processing equipment. Long term inhalation exposure testing requires a significant investment in equipment and staffing resources and therefore requires extra attention to planning and operations to ensure data validity and completeness. Validation of new test systems is included as part of the recently adopted ORD Policies and Procedures Manual, Chapter 13.4 (ORD PPM 13.4) on minimal laboratory requirements. Quality control (QC) practices, as well as manual and electronic data recording and processing

systems, were developed to validate and document studies using these systems. Techniques applied to this effort will be useful to the QA community at large. Multiple QC checks were established both for PM concentrating system variables and exposure chamber parameters. Redundant measurements and checks allowed recovery or reconstruction of lost or missing data and were a major benefit of QC practices. PM concentrating systems included sophisticated and complex mechanical components. Systems performances were dependent on precise measurement and control of as many as 83 interrelated variables. Some variables and parameters tracked were exposure chamber PM concentrations (up to 600 $\mu g/m^3$, up to 5.0 x e^5 pt/cc) and particle size (# or mass based) and temperatures, relative humidities, and vapor saturation ratio throughout the systems, as well as airflows and static pressures at key points. Monitoring (>80 parameters) and controlling (>30 variables) a variety of environmental parameters at various stages during the PM concentrating processes were critical. For most system variables, electronic recording was the only feasible means to collect data from the operating systems. Electronic system operating records and graphic representation of the accumulated data were also developed. Finally, additional detailed QC checklists developed from system operating procedures were used routinely by operators to ensure all required tasks and measurements were completed during each system run. The challenges and the successes of developing and operating such a complex concentrated ambient air PM exposure system will be discussed. *This is an abstract for presentation which has been reviewed by the U.S. EPA; views expressed do not necessarily represent EPA policy.*

Chasing the Plume with One Analyzer, One Engine and a Prayer

Donovan Rafferty
State of Washington Department of Ecology

Last year decision makers at the State of Washington Department of Ecology, Air Program directed staff to explore inexpensive ways to monitor for ground level ozone. Staff purchased two different lightweight ozone analyzers that were evaluated for ease of use, portability, accuracy, power needs and data logging capabilities.

Of the two analyzers, one showed good results. A Quality Assurance Project Plan (QAPP) was written detailing the Data Quality Objectives of the survey. The plan outlined several Data Quality Indicators and Measurement Quality Objectives which would determine the accuracy of the data collected by the "portable" analyzer.

With limited resources and manpower, the objective of the Mobile Ozone Survey was to "probe" into areas where no ozone monitors currently existed to gain information on ground level ozone concentrations in Washington State. Observations were also to be taken between existing ozone monitoring sites in the Puget Sound Basin to determine how effectively the established ozone monitoring network was in capturing ozone events.

The analyzer (along with other instruments) was placed in a vehicle. On days when ozone forecast models predicted elevated ozone concentrations, the vehicle was deployed to where the ozone "plume" was predicted to occur.

Two ozone model forecasts were routinely used to reconnoiter before the "target" area was selected. The Air Indicator Report for Public Awareness and Community Tracking and NOAA National Weather Service Experimental Ozone Air Quality Forecast Guidance were used to determine where each "mission" would take place.

Once in the target area the ozone concentrations recorded by the "mobile" analyzer were compared against hourly near-real-time data from AIRNOW-Tech and used to "set the sights" on where the highest concentrations were occurring. Following each mission, the accuracy of the model forecast was compared against the mobile monitor and other ozone analyzers in the network.

The Mobile Ozone Survey demonstrated an additional method for decision makers to help assess their ozone monitoring network. Combined with ozone model forecasts and AIRNOW-Tech a single person can "find the target" with only one analyzer, one engine and a prayer.

Standardizing Data Reporting, Review, and Storage: Examples from the Front Lines

1. Challenges of Planning and Integrating Data Reporting, Verification, and Storage, for a Large Scale Sediment Remediation Program - Lou Blume

2. EXES (Cost savings and efficiencies) – Y. Yang

3. Regional Experiences with Improving Data Validation Processes - Bob Runyon, U.S. EPA Region 2

4. State Experiences with Data Review Processes - Jack Kreuger, State of Maine

5. U.S. Army Corps Experiences with Automated Data Review and Validation - Brian Jordan, U.S. Army Corps of Engineers

6. Application and Use of Labels to Identify Checks Performed During Analytical Data Validation - Anand Mudambi, U.S. EPA

If EPA and its partner Federal Agencies can develop a uniform QAPP, it must develop a uniform data management process including data reporting, data review and data storage. This session will include examples of the data management challenges and solutions faced by agencies and states involved in environmental data generation including, Federal Agencies, the Superfund program, an EPA National Program Office, a Regional office, and a State agency.

The Staged Electronic Data Deliverable (SEDD) is a uniform format for electronic delivery of analytical data for environmental programs. The data deliverable generated by SEDD is an industry-standard Extensible Markup Language (XML) file. A major advantage for laboratories is that SEDD can be implemented in stages. This allows laboratories to meet Electronic Data Deliverable (EDD) requirements for multiple programs without having to overhaul their EDD-producing systems as agency or program needs change.

SEDD is the closest thing available to a scalable electronic data deliverable. This has been implemented under the Superfund CLP program and is currently being used by

EPA [CLP, Remedial Action Contracts (RACs), Superfund Technical Assessment and Response Team (START) contracts, Great Lakes National Program Office (GLNPO) Great Lakes Legacy Act Program], United States Army Corps of Engineers [Formerly Used Defense Sites (FUDS), Military Munitions Response Program (MMRP)]. The SEDD and associated automated data review packages provide a suite of tools to manage data.

This session will also discuss standardized data review software programs that can be utilized in a rapid process with various EDDs. It will also address the difficulties of coordinating the various field data formats with laboratory data and discuss how to capture data attributes for other programs use of this information.

Developing an Agency Quality Glossary

Deborah Ross and Katherine Breidenstine
U.S. EPA OEI Quality Staff

Linda Spencer and Michael Pendleton
U.S. EPA OEI, Office of Information Collection

Background:
The objective of this project is to establish an Agency Quality Glossary to effectively support the Agency Quality Program and to help ensure continuous improvement in all quality aspects. It is critical for EPA's Quality Assurance (QA) community and others to use standard quality terminology to communicate quality issues effectively throughout EPA's diverse disciplines. Over the years, there have been many "quality glossaries" containing QA terms developed and used throughout the Agency. To ensure consistency of terms and to improve understanding of quality management activities, the Quality Staff established the Quality Glossary Governance Council. In FY07, the Council addressed the scope and organization of an Agency Quality Glossary, determined business rules for terms to be included, changed or deleted, and has reviewed software to manage the on-going Agency Quality Glossary.

Session Content:
This session will share and discuss with participants the status of the project, its efforts, challenges, and proposed software for managing the glossary, including:

- The proposed list of Agency quality terms, the type of term (e.g., statistics, R & D, evaluation, and/or Quality system) and definitions used for Agency quality activities
- Metadata needed for the types and terms in the glossary
- Roles and responsibilities for managing the glossary (e.g., subject matter experts, data stewards, etc.)
- Demonstration of Synaptica, a COTS package purchased by EPA that supports terminology management

Our goal is to engage the audience in sharing their knowledge, experience, and suggestions to ensure the Agency Quality Glossary is informative, useful and easy to use.

Roadmap to Quality Costs: How to Identify, Categorize, Monitor, and Report Quality Costs for Products and Services

Jeffrey Worthington
Director of Quality
U.S. EPA Office of Environmental Information, Washington, DC

Jonathan D. Frodge, Ph.D.
Senior Limnologist
King County Water and Land Resources Division, Seattle, Washington

Science studies, information, data, information systems and other products and services of any organization must 1) include the proper quality features and 2) be reasonably free of defects. A third area that quality professionals may need to understand and address is related to the costs, or efficiency, of processes involved in product and service production. Some people refer to these costs as the "costs of quality." When the costs concern product or service failure, they can also be termed the "cost of poor quality." Recognizing and knowing that something is a quality cost is important in order to identify areas for improvement. For example, re-working a data system to "cleanse" badly entered data is a form of "scrap and re-work." This presentation identifies major quality cost categories for government product and service types and suggests methods for measuring and monitoring quality costs.

Case Study: Metals Matrix Metadata Mistakes Modify King County Monitoring Management

Jonathan D. Frodge, Ph.D.
Senior Limnologist
King County Water and Land Resources Division, Seattle, Washington

Jeffrey Worthington
Director of Quality
U.S. EPA Office of Environmental Information, Washington, DC

Mishandling of important information within an organization and between partnering organizations can have expensive consequences. Data submitted from King County to the Washington Department of Ecology (Ecology) in 1994 for the 1998 303(d) list included not only values but also the metadata associated with each sample. The metadata included laboratory methodology, measurement units, and the sampling matrix for each sample; SE FRSHWTRSED (mg/kg) and LK FRESHWTR (□g/L). Loss of metadata associated with the list data submittal resulted in an erroneous listing of several King County streams as water quality limited for heavy metals. To meet reporting deadlines, Ecology submitted the 1998 303(d) list to EPA before it was reviewed by King County. In order to remove these streams from the 303(d) list, additional samples were collected and analyzed; the additional sampling and analysis costs were paid by Ecology. This presentation summarizes how simple errors in analysis and mishandling of information can contribute to the cost of poor quality and provides suggestions to ensure only good quality information and data are shared between organizations.

Influencing Change through Collaboration and Information Sharing – the British Columbia's Forest and Range Evaluation Program

Peter Bradford and Thomas Chen
B.C. Ministry of Forests and Range

The Forest and Range Evaluation Program (FREP) is a resource stewardship monitoring and evaluation initiative established by the British Columbia Ministry of Forests and Range (MFR) to monitor and evaluate the stewardship of the province's 95 million hectares of forested public land. Established in 2004 as a foundation of the results-based *Forest and Range Practices Act* (*FRPA*), FREP aims to: (1) assess whether forest and range practices under *FRPA* are effectively maintaining 11 defined resource values; and (2) determine whether these practices, and the legislation itself, meet the government's broader commitment to sustainable resource management.

The FREP mission is to be a world leader in resource stewardship monitoring and effectiveness evaluations; providing the science-based information needed for decision making and continuous improvement of British Columbia's forest and range practices, policies, and legislation.

FREP takes a holistic approach to forest and range resources monitoring. Our management framework is based on shared leadership, with a focus on people, planning, process management, communication of results, influencing change through collaboration and information sharing, continuous improvement, and critical reflection.

The multi-agency FREP team collects scientifically rigorous field monitoring data to improve on-the-ground forest practices. Forest managers are notified of the outcomes of their practices that relate to sustainability. Where systemic problems are evident, this data will inform policy or legislative changes over the longer term.

FREP Quality Management

FREP has integrated the Canadian National Quality Institute's (NQI) Progressive Excellence Program (PEP) as its quality management framework. Thus, quality management is an essential consideration in all aspects of FREP's development. All monitoring indicators and protocols are peer reviewed, and field data checked for accuracy and consistency. Field staff receive rigorous training on each monitoring protocol and also benefit from risk-based, expert-led mentoring and monthly conference calls with monitoring protocol experts. FREP has already undergone external review, and future assessments are planned. From its 5-year strategic plan to its day-to-day operations, FREP benchmarks its performance against world-recognized best practices.

Communications

Communication is one of FREP's critical elements. Monitoring information is shared with government agencies, the public, and forest managers. This sharing serves to stimulate a dialogue between forest industry licensees and government agencies on what works and what doesn't. Site-specific monitoring results are also discussed at the forest district level. Yearly summary reports provide key findings and links to detailed monitoring reports.

A wealth of information is publicly accessible through a document library on the FREP website [http://www.for.gov.bc.ca/hfp/frep/publications/index.htm]. The Annual Report series presents an overview of program accomplishments and future activities; the FREP Technical Note series, FREP Report series, and Discussion Papers

provide detailed monitoring results and offer guidance for the continuous improvement of monitoring activities and protocol development.

Dynamic Evaluation of Meteorological Parameters Using Collocated Monitoring

Mathew C. Plate
Environmental Scientist
U.S. EPA Region 9, Quality Assurance Office

A new focus has been put on Meteorological Monitoring by the EPA with the update of *The Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV, Meteorological Measurements* and required meteorological monitoring for the NCore monitoring network, set to begin formal operations between 2009 and 2011. If meteorological monitors are evaluated it is usually done by the same methods that are used for instrument calibrations. Unfortunately, these methods do not evaluate the dynamic performance of the monitors in the environment in which they have been placed. Additionally, some limitations with monitor siting have the potential to significantly affect data quality. If U.S. EPA is to accept data from these methods as part of a new national program there needs to be an evaluation of the "actual" quality and utility of this data set.

U.S. EPA Region 9 recently assumed the responsibility for auditing 13 monitoring stations in Baja California previously overseen by the California Air Resources Board (ARB). Nine of these monitoring stations include meteorological monitoring. This data is used by the U.S. EPA, ARB, and the Government of Baja California to determine cross boarder impacts of air pollution originating from both the United States and Mexico.

Because this data is critical to meet international agreements and make cross border air pollution determinations, U.S. EPA Region 9 has proposed using dynamic audits, where possible, to verify monitor performance. Last October, U.S. EPA Region 9 performed trial dynamic performance audits of meteorological stations in Mexico. While there were several logistical concerns with these audits, U.S. EPA Region 9's primary concerns were quality related. These fell into two categories: 1) instrument performance; and 2) testing and documentation of dynamic audits.

Issues identified during the U.S. EPA Region 9's trial audits included:

- How much data needs to be collected for representative useful measurements.
- How to mitigate and verify impacts of siting monitors in urban locations.
- What quality control criteria are needed to determine standard instrument response times.
- How to relate "dynamic" to data quality as reflected in the MQOs.

Finally as one objective of meteorological monitoring is to answer questions about pollution transport, is the type of meteorological monitoring currently being conducted sufficient? What, if any, other measurements should be included?

From Through-the-Probe to Emergency Response – Improving Response Support Capacity With Existing QA Resources

Michael F. Davis
U.S. EPA Region VII, Environmental Services Division
Environmental Assessment and Monitoring Branch

U.S. EPA Region 7 owns a truck mounted mobile air quality assurance laboratory which was originally specified and purchased to support onsite through-the-probe assessment of State and Local ambient air monitoring stations as part of the National Performance Audit Program (NPAP). Region 7 staff realized that the mobile lab was underutilized; therefore, we began seeking opportunities to deploy the system for non-routine applications to support emergency response and homeland security preparedness applications. In this paper we present the current and planned modifications to the stock NPAP mobile laboratory configuration in order to provide the system flexibility needed to support emergency response deployments. We will present the actual hardware and software upgrades implemented, the approximate number of person hours needed to accomplish the modifications, and strategies to secure the necessary funding. In addition, we discuss actual field experiences supporting emergency responses, including lessons learned while working under unified incident command.

A Description of the PM2.5 Monitoring Network Performance Evaluation Program and Findings for 2005-2007

Dennis Crumpler
U.S. EPA

In 2005, a EPA's Office of Air Quality Planning and Standards (OAQPS) and the Office of Radiation and Indoor Air at Las Vegas (ORIA-LV) launched an initiative to upgrade the Federal QA program for the Chemical Speciation Network (CSN) and the IMPROVE/IMPROVE Protocol network. The CSN sites are operated primarily by State and local monitoring agencies in urban and suburban areas. The IMPROVE and IMPROVE Protocol sites are operated by Federal Land Managers or State, local and Tribal agencies, respectively, and are generally located in more rural areas. The goals of the initiative were to increase the number of federal level audits to 25% of both networks each year; and to improve the quality of the audits through a reconstructed set auditing procedures and intensified auditor training. The new program requires initial full certification and annual recertifications. A new electronic form was developed to foster a uniform method of reporting monthly performance parameter verification and periodic audit results. EPA is currently implementing procedures to use the forms to post sampler performance verification and audit data of the CSN into the AQS for user-generated QA reports.

A summary that compares the findings data for 2005-2007 will be presented. Significant findings have been made with respect to sampler flow rate calibrations, date and runtime settings; temperature, safety, and siting criteria issues such as major construction nearby. The number of significant findings has decreased over the period.

Several improvements to the network operation are evolving from these audit results.

(1) More attention has been given to periodic maintenance and calibration checks of the samplers
(2) The IMPROVE/IMPROVE Protocol Network has upgraded their internal clocks and temperature probes
(3) Training on safety issues and Standard Operating Procedures has been identified

Three major challenges remain:
(1) Shifting recertification training to the EPA regional offices
(2) Influencing all State, Local and Tribal site operators and auditors to submit QA data to EPA for posting in AQS
(3) Working with the IMPROVE Network to develop a web-accessible location for the site calibration coefficients that will allow certified auditors to ascertain whether or not a sampler's flow rate is within the acceptance criteria during the audit

NATTS QA System and Results of the QA Assessment

Dennis K. Mikel
U.S. EPA Office of Air Quality, Planning and Standards
Air Quality Assessment Division

There are currently 188 hazardous air pollutants (HAPs), regulated under the Clean Air Act (CAA) that have been associated with a wide variety of adverse health effects, including cancer, neurological effects, reproductive effects and developmental effects, as well as eco-system effects. These air toxics are emitted from multiple sources, including major stationary, area, and mobile sources, resulting in population exposure to these air toxics as they occur in the environment.

Our current Government Performance Results Act (GPRA) commitments specify a goal of reducing air toxics emissions by 75% from 1993 levels to significantly reduce the risk to Americans of cancer and other serious adverse health effects caused by airborne toxics.

EPA's Office of Air Quality, Planning and Standards in conjunction with the EPA Regional Offices and State/Local/Tribal air monitoring agencies began implementing the National Air Toxics Trends Station (NATTS) network throughout the United States on January 1, 2004. EPA-OAQPS began its assessment of this program in April 2004 (Technical Systems Audits) and September 2004 (Proficiency Testing "blind" samples to all analytical laboratories on a quarterly basis).

The program is now in its fourth year. EPA and its stakeholders have recommended changes to the program, including adding a new class of compounds, Polycyclic Aromatic Compounds (PAHs). EPA staff are looking at the preliminary data and methods for PAHs and are working with the NATTS community to integrate this method.

The author will give a brief overview of the network, discuss the status and changes to the quality system, and illustrate the results of the proficiency testing and technical issues that the program faces.

ORD's Scientific Data Management Strategy

Lynne Petterson, Ph.D.
National Exposure Research Laboratory
Office of Research and Development
U.S. EPA

A strategy for scientific data management has been developed for the protection, maintenance, preservation, and sharing of ORD's data. The strategy addresses a host of issues that need to be resolved before ORD can move to the use of electronic laboratory notebooks. The presentation will describe the history behind development of the strategy, current efforts (including work on an ontology/taxonomy), and the desired end-state of a modern, web-enabled, highly collaborative scientific work environment.

Advantages and Challenges of Electronic Records for Scientific Data at the U.S. EPA

Thomas Hughes
Experimental Toxicology Division, National Health and Environmental Effects Research Laboratory
Office of Research and Development
U.S. EPA, Research Triangle Park, NC 27709

Paper, hard-bound notebooks have been the traditional method of collecting data for research studies at the U.S. EPA, RTP, NC. Indeed, ORD recently issued an operating procedure for data collection in paper notebooks, ORD Policy and Procedures Manual Chapter 13.2 (ORD PPM 13.2) that was approved by the ORD Assistant Administrator. Paper notebooks do have certain advantages over electronic records; the main advantage is that they cannot be deleted! However, paper notebooks require diligent care and a significant amount of the scientist's time to be compliant with ORD PPM 13.2. In addition, the handwriting in many notebooks can be difficult to decipher during an audit, and notebooks can be misplaced or lost. They are also bulky to store long-term and do not handle large data sheets, such as GC graphs, easily. On the other hand, electronic records offer many advantages; they are easier to read than paper records; they can be uniformly formatted; they are more easily stored, sent, and archived; they are more easily audited; and electronic records can be copied in minutes onto a CD or server. Challenges of electronic records for scientific data are cost (purchase and yearly maintenance fees) and keeping them readable over time. As a regulatory Agency, the U.S. EPA is making progress on the use and standard formats for electronic records. This talk will discuss the successes and the challenges of these efforts with electronic record keeping of scientific data. *This is an abstract for presentation which has been reviewed by the U.S. EPA; views expressed do not necessarily represent EPA policy.*

Improving Laboratory Sample Management

Margie Vazquez and Mitch Binford
National Exposure Research Laboratory
Office of Research and Development, U.S. EPA

"Scientists face increasing challenges in managing their laboratory samples, including long-term storage of legacy samples, tracking multiple aliquots of samples for many experiments, and linking metadata to these samples. Other factors complicating sample management include the need to share samples amongst team members and dealing with multiple sample storage units. To address these issues, the National Exposure Research Laboratory in Cincinnati has an ongoing project to increase scientists' productivity and improve the condition under which their samples are stored. This talk will provide details of the project, including the development of a sample handling policy and the deployment of an electronic sample tracking system."

Section 508 Basics for Providing Access and the Impact on Products and Services

Amanda Babcock
U.S. EPA OEI, Office of Information Access and Analysis

Sarah Buchanan and Katherine Breidenstine
U.S. EPA OEI, Quality Staff

Background:
Section 508 of the Rehabilitation Act of 1973 requires all Federal Electronic and Information Technology (E&IT) developed, maintained, procured, and used to be accessible to all employees with disabilities and all citizens with disabilities.

Session Content:
This session will discuss:

- What is Section 508
- What is E&IT
- When should I think about Section 508
- Available resources at EPA

Next we will also discuss the available resources and how they impact the quality of products and services. Lastly, we will discuss the cost of rework when 508 considerations are not taken into consideration.

Our goal is to engage the session participants in sharing their knowledge, experience, and help to bring about an awareness of 508 requirements, assisted technology, and the cost of rework.

Ecology's Quality System: From Databases to Information Sharing and Decision-making

William R. Kammin, Chris Neumiller, and Chad Brown
Washington State Department of Ecology

As a delegated state for several EPA programs, Ecology maintains a rigorous quality system for the production, archiving, analysis, and presentation of environmental data. Ecology uses this data in many decision-making processes. These processes include 303d assessment listing and delisting, water quality standards-related decisions, and TMDL-related load allocations. Key to Ecology's philosophy of information management is the idea of free and public access to all types of data related to environmental management issues.

Ecology has established several Quality Assurance (QA) policies intended to effectively implement quality assurance practices internally and with our partners and collaborators. These polices require QA project plan development, use of SOPs for all agency sampling, laboratory, and field analytical process, development of a guiding Quality Management Plan, quality implementation within Ecology programs, the use of Ecology "accredited" labs for data submittal to Ecology, and the use of Ecology's Environmental Information Management System (EIM) for data archiving. Additionally, Ecology programs have developed QA policies related to EIM use, QAPP implementation, and other aspects of the QA system. Finally, the Washington State Water Quality Data Act required implementation of a set of rigorous standards for the submittal of "credible" data for water quality decision making related to Federal Programs. All these topics will be discussed.

Ecology's EIM System

Chris Neumiller

The Environmental Information Management System (EIM) is the Washington State Department of Ecology's (Ecology) main database for environmental monitoring data. EIM contains over 5,000,000 records on physical, chemical, and biological analyses and measurements. Supporting information about the data is also stored, including details on over 1500 environmental studies and 40,000 monitoring locations.

Data is supplied to EIM by internal researchers, legacy Ecology databases, and external collaborators such as water quality grantees and hazardous waste cleanup sites. The data is made publicly available on the Web through our Database Search system, which enables tabular or map-based searches and data downloads. For advanced analysis, the MyEIM customizable data search and analysis tool is provided.

With regard to data quality, EIM conforms to national standards to the degree possible, including Environmental Data Standards Council standards, EPA Substance Registry System parameters, and the National Environmental Methods Index. Data quality is also enforced through the assignment of overall QA planning and assessment levels, as well as data qualifiers, accuracy levels, and other quality-related fields. EIM also enforces required elements and valid values during the submittal process for both internal and external users. An extensive on-line help system is provided. All data is submitted electronically in EIM format. Data coordinators and engineers also perform QA checks on the data and assist users with data submittals.

What we do with all of this: Quality assessment in decision-making

Chad Brown

An example of decision-making based on our data management and quality assessment practices is the biennial Assessment of Water Quality for the Clean Water Act Sections 303(d) and 305(b) Integrated Report. Data is submitted to Ecology's EIM Import Module, where it is assessed for quality and uploaded to the production database. Data is then assessed to determine water quality conditions and the results are documented in the Water Assessment Tracking System (WATS). WATS is linked to internet-based review tools including an interactive map and simple query form. These tools allow data submitters to review decisions resulting from the data in the EIM system. How quality considerations guide this process will be discussed in detail.

The Underlying Definitions for Uncertainty in Environmental Data

Betsy Grim
U.S. EPA Office of Pesticide Programs

This session will be an opportunity for transparently characterizing laboratory uncertainty. Both prepared presentations and discussion will be welcome. Presentations to be considered will include: The relationship between error and uncertainty, examples of the determination of uncertainty, sources of error, estimated experimental uncertainty in single measurement and estimated experimental uncertainty in multiple measurements.

Implementing ANSI / NCSL Z540 in an EPA Calibration Laboratory

Paul Groff
Quality Assurance Manager
U.S. EPA, ORD, NRMRL, APPCD

The Air Pollution Prevention and Control Division's (APPCD) Metrology Laboratory (MetLab) provides calibrations for APPCD researchers' equipment. As part of the calibration report the MetLab includes the calculated uncertainty of the device that was calibrated. Uncertainty can be expressed in many ways, which can make it difficult to make an apples-to-apples comparison of two measurements. The ANSI/NCSL Z540.2-1997 (R2002), *American National Standard for Expressing Uncertainty*, (*the Guide*) provides general rules for evaluating and expressing uncertainty in measurement rather than detailed, technology-specific instructions. This presentation will demonstrate some of the techniques used by the MetLab to evaluate uncertainty and demonstrate effective use of the *Guide.*

Uncertainty – A Laboratory Viewpoint

Robert P. Di Rienzo
DataChem Laboratories, Inc.

Uncertainty is associated with results obtained in the laboratory testing activities. It is meaningful to estimate the extent of the uncertainty associated with each result generated by the laboratory. It is also useful to recognize that this measurement uncertainty is likely to be much less than that associated with sample collection activities.

In practice, the uncertainty of a result may arise from many possible sources. The relative contribution of major sources of error and the approach adopted by the laboratory to estimate uncertainty results in the conclusion that many sources of error are insignificant compared to the processes of sample preparation, calibration, and instrumental measurement. The uncertainty associated with these processes can be estimated from quality control data.

Other sources of error are associated with the sample matrix. Laboratory sub-sampling error is not captured by the use of quality control data and can be significant. How a lab approaches sub-sampling may significantly impact decision making.

Information and Data Quality Framework

Jeffrey Worthington
Director of Quality
U.S. EPA Office of Environmental Information, Washington, DC

Many disciplines establish a central "body of knowledge" (BOK) that serves as a reference point for concepts, theories, processes, facts, and other agreed to aspects of that discipline. An information and data quality BOK would rest firmly on a BOK for the quality discipline. The quality BOK includes elements such as quality planning, quality assessment, continuous improvement, quality control processes, reliability, maintainability, statistics, inspection processes, etc. At this time, there is no firm information and data quality BOK. In lieu of the needed BOK, professionals working with information and data quality can rely on a basic Information and Data Quality Framework. The purpose of the framework is to provide a roadmap to considering how to plan, implement, and assess processes that develop information and data products and services. This presentation considers key elements of an information and data quality framework including:

- Identification of information and data products and services
- Identification of information and data features, definition, and measures
- Organizing information and data features into logical management groups
- Recognizing information states and mapping those information states to features and supporting information processes
- Relating governance processes (i.e., quality and information policies) to the organization's information and data quality

The framework provided is enough to form a basic structure for an entire information and data quality BOK and helps knowledge workers to answer some key questions:

- What are information or data products and services?
- What is "quality" for information and data?
- How do I adjust my planning and documentation process to adequately capture information and data product quality?

Data and Information Quality as a Component of the Enterprise Data Architecture

Kevin Kirby, Enterprise Data Architect
Office of Technology, Operations, and Planning
Office of Environmental Information

Jeffrey Worthington, OEI Director of Quality
Office of Planning, Resources, and Outreach
Office of Environmental Information

One of the key components of the Environmental Protection Agency's Enterprise Architecture (EA) is the Enterprise Data Architecture (EDA). The EDA is an important aspect to ensuring data and information quality because the EDA encourages clear definition of data stewardship, shared enterprise-wide data definitions, consistency in data exchange, and a governance process for data and information which includes environmental measurement data. The EDA Program is premised on creating a proactive, enterprise service to organization that focuses specifically on critical data management issues and challenges faced by EPA programs and their partners.

The presentation provides a brief overview of the Agency's EA and the relationship of the EDA to the overall EA. The overview is followed by an analysis of how data and information quality are supported by a robust EDA and how quality managers can learn more about the EDA and begin to use it to support the organization's quality management system.

Conscious Data Quality Management through Data Stewardship

Cynthia Dingman
Data Management Coordinator
Montana Department of Environmental Quality

Data - as it applies to data elements within a database - is as ubiquitous to environmental management programs as air is to living organisms. The manner in which data moves through some organizations may be as unconscious as breathing is to a body: not much, if any, thought goes into it. Poor quality data moving through an organization is analogous to the intake of poor quality air in an organism. It can wreak havoc with all its vital systems. An organization oblivious to the quality of the data coursing through its system may attribute symptoms of poor data quality to other causes such as inadequate staff or poor database design.

An organization with *conscious* data management strives for high quality data. The conscious organization knows that the consequences of poor data quality are too costly to ignore. Rework, time loss, increased liability, faulty decision making, substandard products and lack of public confidence are among the impairments caused by poor data quality.

Data Stewardship provides data consciousness in an organization. Data Stewards are the "white blood cells" of the data management system. Data Stewards work collectively to develop policies and standards that promote data accuracy and consistency, reduce redundancy, and encourage data sharing. Data Stewards work individually to audit data quality, to prevent data contamination, and to improve data management business processes. Data Stewards may ensure database designs correlate to data collection methods and work with IT to test project development and deployment.

Establishing a Data Stewardship program may appear overwhelming; however, it is not insurmountable. Management support helps, but contrary to popular opinion, it is not the key to a successful Data Stewardship program. The keys are (1) selecting a group leader committed to the effort and (2) finding and recruiting those most affected by poor data quality in each program. Once the Data Stewards group is assembled the steps to organizing a successful working group are straightforward.

It is recommended that the group begin by researching Data Stewardship models of other organizations to use as a basis--but not a template--for group organization, roles and responsibilities. The Data Stewards group must be tailored to fit its own organizational and data management challenges and needs: take the time to identify those needs before choosing a group/committee structure.

Establish Data Stewards group priorities. Initially, consider priorities that provide a foundation for future work such as researching and developing an organization-wide database/spreadsheet matrix, creating a data standards policy, or originating a data standards review and approval process. Subsequent priorities may involve training on data auditing techniques/tools or data cleanup projects. Incorporate the Shewhart cycle into your Data Stewardship endeavors: Plan-Do-Check-Act.

Data Stewardship may be the "oxygen" needed to revitalize a polluted data management system.

Quality Assurance in Grants - Policy and Application

Connie F. Thoma
U.S. EPA OEI, Quality Staff

Eugenia McNaughton
U.S. EPA Region 9

Video-taped presentations 10-15 minutes each, of Region 9 Grants Project Officers

This session will provide an overview of current structure of EPA Quality System as applied to grants both at the national and regional levels. Several project officers will discuss one of their grants and best practice for management.

The Job is Not Finished Until the Paperwork is Done

Connie F. Thoma
U.S. EPA OEI, Quality Staff

Mary Wisdom
U.S. EPA, National Air and Radiation Environmental Laboratory

Topic in the Area of Quality Management Systems: Relationship Between QA, Records, and Information Management

Records and paperwork take time and commitment. Why should Quality Managers and Project Officers spend their limited time on these "administrative tasks"? This presentation discusses the pivotal role of records management when combined with the EPA Quality System to improve the quality and defensibility of Agency actions. Observations, challenges, and opportunities will be discussed.

Determining Correlations and Interoperability Between TQM, ISO, and Information Management Documents

Denise R. Weingart Webb
Quality Systems Administrator
Canaan Valley Institute, Mid-Atlantic Highlands

Documents created under TQM, ISO, and Information Management programs are both internal and external verification that organizations comply with regulatory standards for programs, projects, and specific activities. Information Management provides the framework to support these activities and may be considered multi-dimensional when viewed within the "plan, do, check, act" (PDCA) lifecycle. This is particularly beneficial since these programs require participation at every organizational level.

Thus, Information Management has emerged as a specialized administrative discipline under the tenets of information quality management.

This paper will present an overview of planning and implementation tools that will assist any practitioner with:

1. Increasing primary document use and reuse
2. Integrating interoperability between functional groups

The fundamental purpose of this session is to provide summaries of the following key elements:

- Identifying interoperability between TQM, ISO and Information Management documents
- Integrating correlations with document process mapping – a 3 step tool to visualize documentation layers and work flows
- Developing a core management system that integrates PDCA to achieve the needs of multiple processes while reducing redundancy

- Using software, including MS Access, to support production of standardized documents and provide organizational structure for both internal and external records and reports
- Realizing the organizational value of integrating TQM, health and safety, EMS (ISO), and Information Management systems
- Classifying and measuring the benefits of organizational interoperability ("Collect once, Use many" principle, EPA 2004)

Quality systems staff have the unique opportunity to integrate Information Management across a broad spectrum of operations – providing critical focus and support within this specialized administrative discipline.

Using Web Technologies to Spur Innovation and Collaboration

Moderator: Monica Jones, OEI Quality Staff

Panelists: Overview of the EPA Portal
Sarah Buchanan, OEI Quality Staff

Distance Collaboration – Tools and Strategies for EPA Employees
Jean Balent, OSWER/OSRTI

Communities of Practice
Kevin Kirby, OEI

Environmental Science Connector
Holly Ferguson, ORD

EPA is using innovative web technologies to share information and collaborate with our partners and stakeholders. This interactive session will

- Provide a brief overview of web technologies, such as the EPA Portal
- Highlight several innovative projects that use these information sharing technologies;
- Discuss challenges to ensuring the quality, objectivity, utility and integrity of information; and
- Explore opportunities for innovation

Parameters of a dose-response model are on the boundary. What happens with BMDL?

Leonid Kopylev and John Fox
National Center for Environmental Assessment
U.S. EPA Office of Research and Development

It is well known that, under appropriate regularity conditions, the asymptotic distribution for the likelihood ratio statistic is χ^2. This result is used in EPA's benchmark dose software to obtain a lower confidence bound (BMDL) for the

benchmark dose (BMD) by the profile likelihood method. In the context of dose-response modeling, the problems arising when true values of parameters of a dose-response model may be on the boundary were acknowledged long ago, but have not been resolved clearly for the practitioners of dose-response modeling. Recently, Sinha et al (2007), based on earlier seminal work by Self and Liang (1987), demonstrated that the asymptotic distribution remains the same if some of the regularity conditions are violated, i.e., when true values of some nuisance parameters are on the boundary. That is often the situation for BMD analysis of cancer bioassay data.

In this presentation, we use Monte Carlo simulations to investigate one- and two-sided coverage of confidence intervals for the BMD by the profile likelihood method (as implemented by BMDS) when some of the true values of the parameters of a dose-response model are on the boundary. We concentrate on the multistage model, but also consider the log-logistic model, both for a group size of 50 animals and asymptotically.

Fortunately, because two-sided confidence intervals (size 1-2*α) have coverage close to the desired level when there are 50 animals in each group, the coverage of one-sided intervals is bounded between roughly 1-2*α and 1. In most of the simulation scenarios with α =.05, coverage of the BMDL was close to 1, but for some scenarios coverage was close to .9, both for a group size of 50 animals and asymptotically (group size 100,000).

We also demonstrate what happens when the true parameter is below the boundary, as with the shape parameter of a log-logistic model, the coverage of BMDL in a constrained model may be very small and even approach 0 asymptotically!

References:
Self, S.G., &Liang, K-Y. (1987). Asymptotic properties of maximum likelihood estimators and likelihood ratio tests under nonstandard conditions. *Journal of American Statistical Association*, **82**, 605-610.
Sinha B., Kopylev L., &Fox J., (2007). Some new aspects of dose-response multistage models with applications. To appear in *Environmental and Ecological Statistics*. Platinum Jubilee Conference of ISI, World Scientific Publishing, Singapore. Earlier version is available as UMBC technical report:
http://www.math.umbc.edu/~kogan/technical_papers/2007/Sinha_Kopylev_Fox.pdf

The Use of Geostatistics in the Remedial Investigation of the Upper Buffalo River

Mary Beth Ross and Brenda Jones
U.S. EPA, Great Lakes National Program Office

Judy Schofield, Reina Downing, Rex Bryan, and Ken Miller
Computer Sciences Corporation

Since the 1940s, the Buffalo River has experienced pollution problems from excess nutrients, bacteria, and toxic chemicals. The New York State Department of Environmental Conservation (NYSDEC) conducted a study in 2005 to define the nature and extent of sediment contamination within the area of concern. Data from that study are being used to support a remedial investigation in the Upper Buffalo

River. U.S. Environmental Protection Agency's (EPA's) Great Lakes National Program Office (GLNPO) and CSC conducted statistical and geostatistical analyses of the 2005 data to assist project participants in defining the nature and extent of contamination. The results of these analyses will ultimately be incorporated, as appropriate, into the Upper Buffalo River Remedial Investigation and Feasibility Study (RI/FS) being prepared by GLNPO.

A suite of geostatistical tools, including kriging, was used to describe the nature and extent of contamination in Upper Buffalo River sediments. Kriging, an interpolation method originally developed for mineral exploration and mining applies well to sediment assessment and remediation projects. Compared to other interpolation methods, kriging has the added benefits of providing estimates of uncertainty and optimizing sampling designs.

Kriging models were used to estimate sediment contaminant concentrations across the site and the results were used to generate a series of kriged sediment concentration maps for the Buffalo River for several contaminants of concern. These maps will be used to identify areas that may require remedial action. The maps greatly facilitated assessment of the site conditions providing a means to visualize large quantities of data. Project stakeholders used the maps to assist in discussing site conditions and deciding among potential remedial plans.

Sediment remediation projects often involve dredging contaminated sediments. The geostatistical analyses also can assist with estimating sediment volumes that may require remediation. The accuracy of these volume estimates is critical because they are integral to describing the scope of project, developing remedial contracts, and providing performance metrics that are tied to payment to the remedial contractor. For this project, kriging was used to estimate sediment depth across the site, as well as total sediment volume for the Upper River. The kriging variance was used to prepare upper and lower confidence limits of the sediment depth across the site. Sediment volumes were then calculated using these upper and lower limits to provide project planners with an understanding of the uncertainty in the sediment volume estimate and the need to collect additional sediment depth data at the site. If additional sampling is deemed necessary, the kriging model can be used to optimize a statistical sampling design with specified level of confidence. Once remedial goals are established for the contaminants at the site, the kriging model also can be used to identify sediments exceeding these remedial goals and estimate the volume of sediment targeted for removal.

Parameter Estimation - Modified Delta Log-normal Approach versus Censoring Techniques

Nelson M. Andrews
U.S. EPA, Office of Water, Office of Science and Technology, Engineering and Analysis Division

For effluent guidelines, a prominent characteristic for measurements associated with effluent data, is the uncertainty of measurements below a fixed value. Such a fixed value is either a "method detection limit (MDL)" or a "reporting/quantitation level (QL)". Both limits are a function of the analytical method used in the measuring process. When concentration values are reported as less than the MDL, the analytical laboratories will assign a value equivalent to the MDL rather than the reported

measurement. When the value is greater than the MDL but less than the QL, the analytical laboratories may assign a value equivalent to the QL value as the reported measurement. Regardless of which limit is used, such a reported value is known as the "minimum reporting level (ML)". From statistical nomenclature, data having some values with this type of uncertainty (less than a given value) is called left censored data. Another prominent characteristic of effluent guideline data is that pollutant measurements are typically randomly distributed according to a log-normal distribution. This statement is supported by decades of analyzing influent and effluent measurements from industrial wastewater samples.

In this paper, I examined three approaches for estimating the mean, standard deviation and the population percentile (upper 99^{th}) of log normally distributed effluent data. The three approaches are the modified delta log-normal approach (modification of Brown/Aitchison's delta log-normal approach), the least squares approach and the maximum likelihood approach. I examined the hypothesis that there is no difference in the parameter estimation accuracy among these approaches. To compare the approaches, I formulated a null hypothesis that assumes no significant difference in the estimation accuracy of the three approaches. To verify or disprove this hypothesis, I generated random values from known distributions having known parameters (mean and standard deviation) and I tested the ability of each approach to accurately reproduce the upper 99^{th} percentile of the corresponding log-normal distribution.

Getting Your Input to the National Dialog on Access to Environmental Information

Nancy Wentworth
Director
Environmental Analysis Division
U.S. EPA/OEI/OIAA

This presentation will provide an overview of EPA's CIO effort in conducting a National Dialog on Access to Environmental Information to better understand the needs of its major public audiences for environmental information. EPA's National Dialog will offer a variety of forums for input, including online and in person forums, stakeholder focus groups, and special events. Also, input from the National Dialog will be used to assist the Agency in developing a strategy on steps EPA can take to provide greater access to EPA information. This presentation will generally cover:

- Overview of the effort;
- Who are the target audiences;
- What are the topics for the dialog;
- How to get involved;
- What we have learned to date; and
- What outcome is expected from this effort and its timeframe

Audience members will be encouraged to ask questions and provide feedback during the session and throughout the duration of the conference.

eQMP: Implementing Electronic Quality Management Plans

Gary L. Johnson
U.S. EPA Quality Staff
Research Triangle Park, NC 27711

Since 1980, EPA policy has required that all Agency organizations collecting and using environmental data for Agency decision making shall develop and implement a quality management system (QMS) in programs providing products and services based on such data. The Quality Management Plan (QMP) is the key document that describes the processes and procedures in an organization's QMS, the roles and responsibilities of personnel, and how the QMS is applied to the organization's business lines; that is, it documents how an organization's QMS meets the requirements of the Agency's quality policy and implementation standards for collecting and using environmental information to accomplish its mission.

To date, most QMPs have been paper documents that were written by an organization, reviewed by the Quality Staff, and approved by the Office of Environmental Information (OEI) for implementation for up to five years. The paper-based QMP has enabled the QMP to remain a stable document, but it was not easy to use and it may not reflect current quality assurance practices and procedures in the organization's QMS. The electronic QMP (eQMP) has been proposed as a tool that will not only address all current QMP requirements and the new requirements expected to emerge in the expanded Agency Quality Policy, but will also provide for increased ease of use and access to current information and tools through real-time links. Moreover, eQMPs will enable organizations to keep their QMPs current and make them readily accessible by users.

In order to test the eQMP concept, the OEI/Quality Staff has funded three pilots in a Region (i.e., Region 2), a National Program Office (i.e., Office of Air Quality Planning and Standards), and a National Research Laboratory (i.e., National Risk Management Research Laboratory). Quality Staff provided project guidance and contractor support for design and programming, and the three pilot organizations provided the content.

This session includes four presentations that will describe the concept of the eQMP and its principal design framework, the goals of the pilot testing, and the experiences of the pilot organizations in participating in the pilots and in implementing and using this tool.

- "eQMP Overview and Conceptual Design" - Gary Johnson (U.S. EPA, Quality Staff) and Kevin Hull (Neptune & Company)
- "Region 2 eQMP Implementation" - Marcus Kantz (U.S. EPA, Region 2)
- "ORD National Risk Management Research Laboratory eQMP Implementation" - Lauren Drees (U.S. EPA, NRMRL)
- "OAR Office of Air Quality Planning Standards eQMP Implementation"- Joe Elkins (U.S. EPA, OAQPS)

`

Chaotic, but In Control – Managing a Flurry of Data Processing and Analysis Activities for the Total Coliform Rule's Six-Year Review

Michael Messner, Ali Arvanaghi, and Susan Shaw
U.S. EPA Office of Ground Water and Drinking Water

EPA's Total Coliform Rule (TCR) is currently under Six-Year Review. Until recently, the only TCR information available to EPA has been the violations entered in the SDWIS database. Now, for the first time, millions of direct measurement results, generated under the rule, have been provided by 40 primacy agencies (mostly States). Our TCR Team found itself overwhelmed by the amount of data and the number of analyses and data summaries that could be required to respond to management and Advisory Committee requests. While a contractor addressed data quality concerns (working under an Agency-approved QA plan), our team was only able to imagine the sheer volume of work coming our way.

This paper describes our team's efforts to build a system for documenting our work, which included data reduction, exploratory data analyses, statistical modeling, and reporting. The system utilized MSAccess, with forms adapted to these different activities. When completing the form, the analyst records information about input data, data processing steps, quality control checks, results, and any quality issues that were encountered. Finally, the analyst describes the end use of the results and related priority for QA oversight. Our QA Manager was notified of all high-priority activities as they were implemented, so she could view the key QC checks and consider the need for additional review on her part.

This paper tells the story of how our system developed, highlighting important successes and failures. Will we be disciplined enough to use the tool routinely? How might the quality of our work be different without the tool? Will we use this kind of tool in the future? Would we recommend it to others? The paper will provide the answers to these and other questions. As of right now (abstract submittal time, January 2008), we're energized and enthusiastic, but a ton of data and information requests are about to land on our desks. Stay tuned!

Practical Problems in Remotely Sensed Image Acquisition

George M. Brilis
Geospatial Quality Council
U.S. Environmental Protection Agency

Remotely Sensed (RS) images include satellite and aerial photographs. Though "picture-taking" technology has made significant advances in the consumer and professional industries, some practical problems may continue to remain.

This quality perspective is not intended to address all RS quality issues, nor provide solutions to all possible problems that may arise. The main intent of this perspective is to raise the level of awareness in the Quality Professional community to some quality issues in remote sensing. In addition, it is also intended to identify some issues that are not in the control of the typical RS image users, such as GIS analysts.

The above-stated issues may change and evolve with technology, law, use and misuse of remotely-sensed images. Real-world images showing some of these common sources of error in satellite and remotely-sensed images are also presented and discussed. Some suggestions are made for the evaluation of remote sensing projects and products.

Notice:
Although this work was reviewed by EPA and approved for publication it may not necessarily reflect official Agency policy.

Guidance for Developing Global Positioning System (GPS) Data Collection Standard Operating Procedures and Quality Assurance Project Plans

George M. Brilis
Geospatial Quality Council
U.S. Environmental Protection Agency

> "How can we harmonize GPS Data Collection Activities to address quality issues, increase confidence, improve interoperability, and facilitate QA review and evaluation?"

After establishing a foundation for the EPA National Geospatial Program, the EPA Geospatial Quality Council (GQC) is, in part, focusing on improving administrative efficiency in the geospatial community. To realize this goal, the GQC is developing Standard Operating Procedures (SOPs) and Quality Assurance Project Plans (QAPP) in a "template" format that can be tailored and adapted by organizational entities in the EPA and its extended partners (other Federal, State, local governments and the private sector).

Since its formation in 1998, the GQC has developed products that provide QA guidance for geospatial activities and research. Two GQC products are references for the EPA National Geospatial Data Policy:

- *EPA Guidance for Geospatial Data Quality Assurance Project Plans*, EPA/600/R-01/062
- *Global Positioning Systems: Technical Implementation Guidance, (GPS-TIG)* Revision 2.0, July 2006, [EPA/600/R-03/001].

By implementing the guidance provided by the above-mentioned documents, Region 5 developed a sound GPS SOP and QAPP. The GQC further developed Region 5s' products and is providing the *Guidance for Developing GPS Data Collection SOPs and QAPPs* to the greater geospatial community.

The GQC has developed this guidance to harmonize the process of collecting, editing, and exporting spatial data of known quality using the Global Positioning System (GPS). This document does not attempt to detail the specific functions of the various receivers since the rapid advancements in GPS technology would necessitate constant, diligent updates to this document.

Though the concept of the "Graded Approach" was previously communicated to the Geospatial Community, this document is the first to establish QA Categories for the Geospatial Community. Since "one size does not fit all," QA Category parameters are suggested for GPS users.

This session will review the QA Categories suggested for the Geospatial Community, highlight critical parts of the SOP and QAPP templates, and provide QA Professionals with quality evaluation consideration points.

Notice:
Although this work was reviewed by EPA and approved for publication it may not necessarily reflect official Agency policy.

Principles of Survey Management Roundtable

Mel Kollander
Kollander Associates

Barry D. Nussbaum
U.S. EPA Office of Information Access and Analysis

Patricia Mundy
U.S. EPA Quality Staff

This workshop has two major parts: a non-mathematical presentation of survey elements followed by a question/answer/discussion session. The presentation covers the most important aspects of EPA's Survey Management Handbook, whose principles are required to be followed on any EPA survey. Come see and hear this opus in person!! The topics covered in the presentation portion are the planning of a survey, the analysis plan, data collection methods, questionnaire design and testing, some basic probability sampling, and special EPA requirements. The discussion roundtable permits not only general questions and answers but also the opportunity for attendees to get expert advice on specific surveys they have used or are considering.