SLEIS – A Shared Emissions Inventory Management Tool

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Abstract

The State and Local Emissions Inventory System (SLEIS) allows permitted facilities to submit point source emissions inventory data and related meta-data to state and local agencies via a Web-based, CROMERR-compliant reporting system. SLEIS positions organizations to better manage and review collected data, including the quality assurance of emissions inventory data submitted by regulated entities. SLEIS also includes an Exchange Network interface to manage the generation and submission of XML files to U.S. EPA's Emissions Inventory System (EIS).

SLEIS has been designed and developed by a consortium of state and local environmental agencies with shared needs for emissions inventory development. By combining resources and collaborating throughout the software development process, the consortium has been able to deliver a shareable emissions inventory data management system that is an extremely powerful and yet cost-effective solution for the partner organizations.

We will discuss how SLEIS enables the regulated community to meet reporting obligations by providing a secure, intuitive, and streamlined interface for the submission of facility inventory and emissions data and meta-data.

We will also explain how SLEIS brings much greater efficiency to the collection, processing, analysis, and quality assurance of emissions inventories for the consortium partners, while allowing each member of the consortium with the ability to configure the system to meet their own unique needs.

This innovative, cost-sharing project has streamlined and enhanced the emissions inventory development process for both point sources and the agencies.

Introduction

Over 20 state and local agencies used a software product called *i*-STEPS to manage their point source emissions inventory data.[1] For the most part *i*-STEPS met the emissions inventory programs' point source data management needs. It had the capability to collect data from facilities, allowed them to quality assure the data after it was received, and then to generate export files to satisfy U.S. EPA reporting requirements. However, *i*-STEPS design layout

reflected U.S. EPA's Aerometric Information Retrieval System/AIRS Facility Subsystem (AIRS/AFS). The National Emissions Inventory data system's format changed over the years and most recently was reengineered again into the Consolidated Emission Reporting Schema (CERS) for its latest Emissions Inventory System (EIS). Fundamental differences between *i*-STEPS and the CERS schema caused the contractor who developed and supported *i*-STEPS to conclude that it would no longer be able to support the system without costly system redevelopment. Faced with the prospect of not having contractor support for their aging system, a number of state and local agencies that used *i*-STEPS met at the 2008 Emissions Inventory Conference to discuss their options. The agencies agreed to form a Consortium to apply for an Exchange Network grant to design a modern emissions inventory data system to replace *i*-STEPS. The new system would facilitate the emissions inventory data collection, quality assurance, and reporting to U.S. EPA. This paper will discuss the formation of the SLEIS Consortium, the extensive collaboration between the agencies, the contractor selection process, design, development, testing, and deployment of the system.

Although the Consortium began with eight member agencies, two local agencies in Pennsylvania decided to adopt the state emissions inventory system and leave the group. The agencies that remained and successfully deployed SLEIS were:

- Arkansas Department of Environmental Quality
- Arizona Department of Environmental Quality
- Delaware Department of Natural Resources and Environmental Control
- Nashville/Davidson County Metro Public Health Department, Pollution Control Division
- New Hampshire Department of Environmental Services
- West Virginia Department of Environmental Protection

Environmental Information Exchange Network Application

U.S. EPA staff learned about the problem caused by their NEI reengineering project and its impact on the State and Local (S/L) agencies that depended on the *i*-STEPS software. During the June, 2008 emissions inventory conference they set up a meeting room for the agencies that were interested in a replacement system and informed them about the availability of Exchange Network grants.[2] The Exchange Network is an information network that facilitates the electronic sharing, integration, analysis, reporting, and use of environmental data from multiple sources. It provides funding to environmental agencies to develop information technology and management capabilities needed to actively participate in the Exchange Network. Activities eligible for funding under the 2009 Exchange Network grant program that were directly relevant to the Consortium agencies were:

- **Data Exchange and Integration** – supporting the development of the capability to exchange data through the Exchange Network; and
- **Collaboration** – supporting collaborative, multi-partner projects that demonstrate the value of the Exchange Network.

The highest Exchange Network priority activity in federal FY 2009 was for completion of regulatory and national system flows for data exchanges.

The deadline for applying for the Exchange Network grant was November 21, 2008. The Exchange Network requires that one agency be the lead agency for multi-partner grant applications. By applying for the grant as a Consortium instead of a single agency, the size of the potential grant was increased from $300,000 to $500,000. The Consortium agencies accepted the offer of the emissions inventory manager from the Arkansas Department of Environmental Quality (ADEQ) to assume the lead agency role. The Consortium collaborated extensively from September through November to complete the application before the deadline. The application package consisted of a Cover Letter, a Project Narrative/Work Plan, a Resume of the Project Manager, and an SF424 Application for Federal Assistance.

The Exchange Network grant award process for multi-partner grant applications also called for for the each member agency's Director to send a statement of support for the project. The agencies not only had to support the grant, they also had to make certain commitments. Each of the agencies committed to the following:

- Work with other consortium members to define user and technical requirements.
- Participate in conference calls to review work products, assess progress, and to share ideas.
- Implement the web solution for the agency.
- Share the results of the project with other state, local and tribal agencies.

Each of the Consortium agencies provided letters[3] signed by their Air Directors to the ADEQ. The ADEQ submitted the application package before the deadline and in a letter dated March 25, 2009 the application for a $500,000 award was tentatively approved by EPA[4] pending completion of several additional forms.

As a side-note, one of the requirements for the Exchange Network grant application was that the project must be named. After some discussion the consortium agencies selected SLEIS. The SL part was because of its State and Local agency partnership, while the EIS part referenced the cause and target of our project: EPA's Emissions Inventory System.

Strawman

After forming the Consortium, and initiating the Exchange Network grant application, the next step was to find common ground. In July, 2008 the emissions inventory manager for the Air Division of the ADEQ sent out a questionnaire to the member agencies to identify their minimum needs for the new system[5]. In August, 2008 the West Virginia Department of Environmental Protection (WV DEP) Consortium representatives prepared a first draft of a needs analysis spreadsheet[6] and requested ADEQ to forward it to the Consortium agencies to complete. While it reflected many years of emissions inventory experience it was not comprehensive enough to reflect the business practices of all of the member agencies. The first draft of the needs analysis, which was called the "Strawman," contained some 20-odd questions. The Consortium representative from the Delaware Department of Natural Resources and Environmental Control (DNREC) added about 80 additional criteria which formed the basis for the needs analysis that occupied the Consortium agencies for almost a year. This collaborative effort, while requiring a lot of time from the Consortium agencies, resulted much greater consensus and clarity in what

we expected from the final system. Specifically, it reflected the cumulative experience of many agency staff with experience in collecting, managing, and exporting emissions inventory data.

The WV DEP representatives assumed responsibility for maintaining the Strawman needs analysis. There was a lot of participation and discussion by the Consortium agencies in its development. There were nearly 50 revisions to the Strawman and each version was usually associated with at least one conference call. The final version[7] contained about 110 features but many more than 10 requirements were added to the original list: many of the originals were combined or deleted.

The Strawman spreadsheet listed the State/Local agencies as the column headings and Features in the row headings. The values in the matrix contained ratings of the importance each agency placed on each feature. The instructions for assigning ratings were:

> "Features in the NEW System: indicate if you think the items listed below are Mandatory, Important (but could compromise if necessary), Want (but not critical), Do Not Need, or Do NOT Want (will conflict with our agency's needs)."

Near the end of the process numerical values were assigned to each rating:
- Mandatory   = 5
- Important   = 4
- Want   = 3
- Do Not Need   = 2
- Do Not Want   = 1

The numerical ratings were averaged on another worksheet and then the average ratings were sorted largest to smallest. There were 28 features that all of the agencies rated as mandatory. Some of the most important from the perspective of non-Consortium agencies that might consider adopting the SLEIS software are listed below:

- The software shall not be dependent upon any particular database. It should be easily ported to any full-featured, Structured Query Language (SQL)-compliant database;
- The participating agencies in the consortium shall each receive ownership of all code generated;
- The system must be web based and allow facility users to submit data via the Internet;
- SQL coding must be done using ANSI-standard SQL – no specialized database functions allowed;
- No dynamic SQL should be used in the web application to prevent SQL injection attacks.
- Non-proprietary software to allow for S/L customization;
- Sufficient documentation that modifications will not have to be sole-sourced
- Database server will be Microsoft SQL Server or Oracle;
- New systems schema is compatible with EPA's Consolidated Emissions Reporting (CERS) schema;
- CROMERR compliant;

- The system will calculate emissions based on AP42 or Local emission factors and user supplied equation. Emissions estimates will be identified using the appropriate EIS methods and codes;
- Widows and orphans QA;
- Data structure and code tables as provided by the contractor consistent with those in new EIS and can be modified by S/L agency; and
- Agency must be able to add, delete, and lock fields.

One feature that all but one agency rated as mandatory that still – fortunately – made it into the SLEIS final product was the ability to export to EPA's EIS through EPA's Exchange Network in the CERS schema format using Extensible Markup Language (XML). Another feature that did not receive 100% of the maximum rating, but made it into the final product, was the ability for facility inventory preparers to import and export Excel spreadsheets rather than having to enter data screen by screen.

RFPs/RFQs

As the Consortium agencies approached completion of their Strawman needs analysis, the ADEQ began the process of soliciting proposals from contractors to develop a web-based point source emissions inventory reporting and database management system. Most of the agencies were familiar with the Request for Proposals (RFP) procurement process but the state of Arkansas often employs the Request for Qualifications (RFQ) method for information technology projects.

> "*R1:19-11-204 Requests for Qualification Procurement Method*
> *The request for qualifications procurement method is used, with prior written approval from the Director of the Office of State Procurement, when the qualifications or specialized expertise of the vendor is the most important factor in selection. The RFQ is sent to those vendors whose work resume' indicates that they are best suited to perform the scope of work or services required. Notification of RFQ's, for which the OSP is responsible, in amounts greater than $25,000, will be made on the OSP website. www.arkansas.gov/dfa/procurement. The agency makes its initial selection based upon the respondent's qualifications. Only after the most qualified respondent is identified does cost become a factor in determining the award. Discussion may be conducted with qualified vendors who, based upon qualifications submitted, are determined to reasonably be susceptible of being selected for the purpose of clarification to assure full understanding of, and responsiveness to the solicitation requirements, and to obtain best and final offers.*[8]"

The key difference between RFPs and RFQs is the importance placed on cost. For RFPs, cost is the primary consideration while for RFQs, contractor qualifications are the highest priority. After some hesitation the Consortium agencies agreed to the RFQ method. In early August, 2009, ADEQ provided a draft RFQ for SLEIS. Discussions between the agencies moved along pretty quickly and in an email dated August 21, 2009[9] the ADEQ requested each agency's approval of the draft RFQ and the final RFQ was posted on September 11, 2009[10].

The final RFQ contained most of the Mandatory and Important requirements of the Strawman. Vendors had about a month to send in their responses. It contained 38 required functions and 33 desired functions. Although many of the required functions were identical to those contained in the Strawman, several of the required functions in the final RFQ were clarified or made more explicit. Particular emphasis was placed on compatibility with the CERS schema. Other critical features from the Strawman retained in the RFQ that would be of interest to the larger emissions inventory community require the system to:

- Be deployable in both MS SQL and Oracle database servers;
- Be owned by the Consortium, and each agency will receive a copy of all source code with documentation;
- Be web-based and allow submittals by facility users via the Internet using common browsers such as Internet Explorer or Mozilla Firefox;
- Be secure from unauthorized access, such as no use of dynamic SQL to prevent SQL injection attacks;
- Be CROMERR compliant;
- Meet security protocols of each agency;
- Have an integrated node client or web interface that allows CERS XML files to be submitted to EPA's EIS test and production environments;
- Be a multi-year database;
- Be able to perform emissions calculations using either standard/nonstandard emission factors or select emission equations;
- Allow agency administrators to set whether facility users can see previous year's data when entering new data; and
- Include validation utilities that contain relevant EIS QA checks.

Contractor Selection

Several vendors had learned about the SLEIS Consortium and had prepared presentations of emissions inventory products even before the RFQ was released. However, no decisions could be made until a vendor selection committee was formed. In an email dated September 25, 2009[11] the ADEQ informed the Consortium agencies that the Arkansas Office of State Procurement (OSP) allows members from other agencies to participate in vendor selection. However, the OSP would approve no more than five agencies in the selection committee. Therefore, the Consortium agencies were asked to volunteer or defer their seat at the table to serve on the selection committee. The selection committee was finalized within two weeks and consisted of the states of Arkansas, Delaware, New Hampshire, and West Virginia; and one local agency, Allegheny County.

The RFQ discussed above also contained a "Criteria for Selection" section which listed general and specific criteria for selection. The general criteria were:

> "The vendor should address each item listed in this RFQ to be guaranteed a complete evaluation. After initial qualification of proposals, selection of the successful vendor will be determined in Committee by evaluation of several factors.

Submission of a proposal implies vendor acceptance of the evaluation technique and vendor recognition that subjective judgments must be made by the ADEQ Evaluation Team during the assignment of rating points.

Proposals shall be evaluated by the ADEQ Evaluation Team, which will include representatives from other SLEIS consortium agencies. Other agencies and consultants of ADEQ may also examine documents."

The specific criteria were:

1. Describe your experience analyzing, designing, developing, building, and implementing emissions inventory reporting systems for government agencies. (Maximum of 25 points for this response)

2. Describe your knowledge of federal environmental regulations related to emissions inventories such as the Air Emissions Reporting Requirements. (Maximum of 10 points for this response)

3. Describe your experience and knowledge of the EPA's Exchange Network, including any relevant experience involving the development and implementation of data flows. Include any experience with data flows using NIF 3.0 or the Consolidated Emissions Reporting Schema. (Maximum of 20 points for this response)

4. Describe your experience developing, building, and implementing a CROMERR-compliant electronic reporting system. Include your experience in preparing a CROMERR application. (Maximum of 10 points for this response)

5. Describe your expertise in project management, particularly with projects that involve extensive involvement of government agency staff to ensure that the final project meets the unique needs of the agency. (Maximum of 10 points for this response)

6. Describe your experience with maintenance and service contracts following successful implementation of IT products. Include the scope of your personnel resources for satisfactorily meeting the long-term needs of clients. (Maximum of 10 points for this response)

7. Describe why you think that your company is best qualified for this RFQ. Describe similar projects, exceptional skills with required products, experience in a collaborative programming environment, or any other factor that you feel is relevant. Please limit this response to two pages. (Maximum of 25 points for this response)

8. Describe your knowledge of and experience developing with the following software:
      a. .NET programming languages including. (Maximum of 20 points for this response)
            i.   ASP.NET
            ii.   VB.NET

        iii.   C#.NET
    b. Microsoft's SQL Server 2005 or 2008
    c. Oracle

9. Respond to the list of mandatory and desired system features in sections 2.3 and 2.4. Briefly describe how you might implement these features in an El reporting and database management system. If applicable, describe how you implemented similar features in previously developed systems. Responses to this question do not need to include technical details but should give a general overview of your solutions for implementing these mandatory and desired system features. (Maximum of 40 points for this response)

These criteria were compiled into an Excel spreadsheet for the selection committee's use in the contractor selection process.

ADEQ received proposals from six vendors. The vendors' proposals were forwarded to the selection committee on October 16, 2009 and on January 6, 2010 ADEQ announced that Windsor Solutions had been awarded the contract to analyze, design, develop, build, and implement a web-based Emissions Inventory reporting system for the SLEIS Consortium as outlined in the RFQ. Over the next few months, Windsor Solutions began work on the analysis phase of the project which included providing details on each agency's operating systems and database servers.

Software Development Lifecycle

Along with Mandatory and Important requirements documented in the RFQ, the SLEIS Consortium provided also provided Windsor with a set of background materials prior to initiation of the Analysis Phase of the project. Windsor analyzed the requirements and background materials and produced detailed Requirements Definition documentation composed of workflow diagrams and use cases for all system functionality needed to meet the requirements of the system. In parallel, Windsor collected information requirements to develop a high-level Information Architecture that would serve as the basis for the logical and physical data model to be developed in the Design Phase of the project.

The Requirements Definition was reviewed with the Consortium members through both on-site and on-line meetings, undergoing multiple revisions until final Consortium approval was obtained.

Upon Consortium approval of the Requirements Definition, Windsor produced a Web-based, functional prototype of key system features, as well as static prototypes, using the Balsamiq prototyping tool, of all remaining system features. These prototypes comprehended all requirements of the Requirements Definition. In parallel, Windsor developed the logical data model and accompanying data dictionary for the system. The system prototype and logical data model design materials served as the high-level design (HLD) of the system.

The HLD was reviewed with the Consortium members and industry stakeholders through both on-site and on-line meetings, undergoing multiple revisions until final Consortium approval was obtained.

Following Consortium approval of the HLD, Windsor utilized the Agile Scrum Framework, breaking the detailed design and development effort into seven, three-week "sprints" where each sprint included development of the detailed design materials, development of the actual application components designed, development of test cases/scripts, unit testing of the components completed during the sprint, and integration testing of all system components completed to date.

At various points in the development process the system was made available to the SLEIS Consortium members and representatives from private industry (see **Figure 1**, below) to perform system testing of the application against a Windsor-hosted test environment. Testers utilized the test cases/scripts developed during the sprints to guide their test efforts. Feedback collected from system testing was captured in Windsor's internal issue tracking system, and formal change management processes were established and used through completion of the system.

After all system functionality had been completed and system-tested, several user acceptance test releases were conducted. Prior to user acceptance testing by the Consortium, data migration processes were developed to migrate existing data from the legacy *i*-STEPS systems (Oracle, MS SQL, and MS FoxPro based databases) to the SLEIS database for each Consortium member agency (Oracle or MS SQL based, depending on the agency).

Following user acceptance testing, detailed deployment and configuration guides were developed, and the application was deployed into the Consortium member's environments. Windsor performed various training sessions to potential users, and train-the-trainer sessions for key representatives from each participating agency of the Consortium.

The system is now within a six-month warranty period, ending August 31st, 2012. During the warranty period Windsor Solutions is addressing high priority issues/bugs and system enhancements through periodic maintenance releases.

Figure 1.
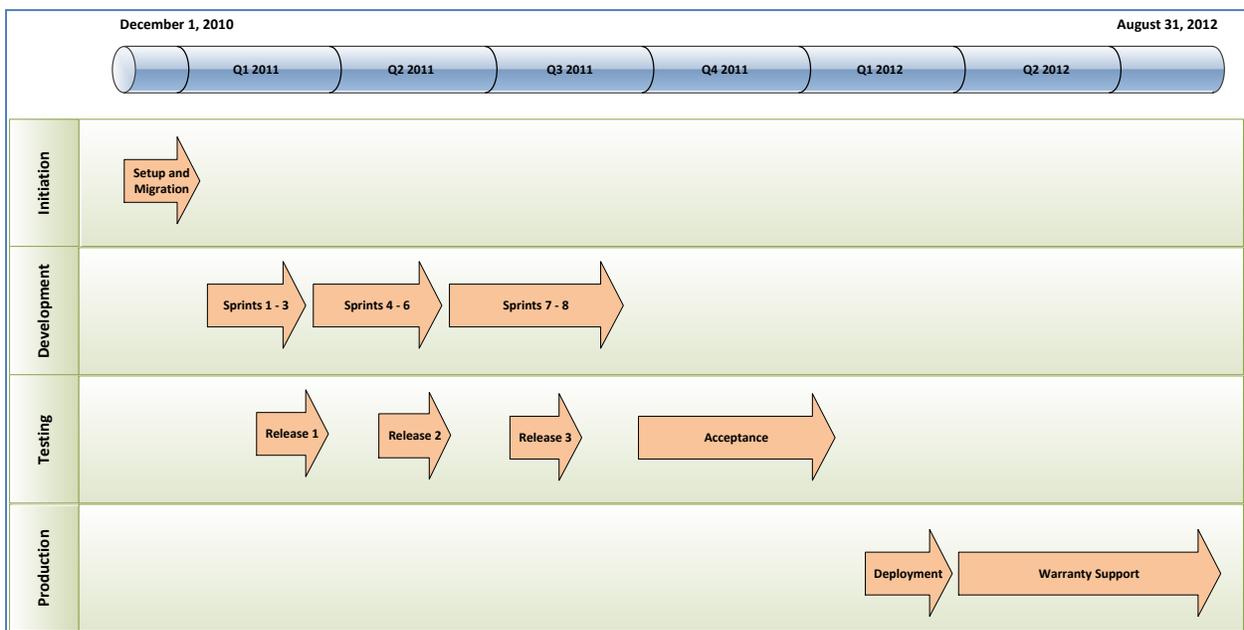
Summary/Conclusions

This paper discussed the process that a multi-partner consortium of agencies used to secure funding to develop emissions inventory software that is compliant with U.S. EPA's new Emissions Inventory System (EIS). The agencies all shared the same *i*-STEPS software and although it was showing its age, it was still functional and the agencies could probably have continued using it indefinitely. When the vendor who developed *i*-STEPS informed the agencies it would no longer be able to support and update the system to enable it to report to the EIS, the agencies were forced to seek alternatives. At the 2008 emissions inventory conference U.S. EPA staff were made aware of the agencies plight and offered effective support in the form of setting up meetings, informing them about the availability of Exchange Network grants, and inviting emissions inventory software vendors to demonstrate their software. And so a Consortium was formed to replace the agencies' *i*-STEPS software with a new system to be called SLEIS.

The Consortium agencies collaborated extensively over the next several years to prepare an Exchange Network grant application, to clarify their expectations in a thorough needs analysis, and to select a contractor to develop the new software. The selected contractor worked well with the Consortium agencies through the software development process and provided excellent customer service. This project was made more challenging for the software developer because they were designing a system to be deployed on the networks of six different agencies, each with different security protocols and either MS SQL or Oracle servers. Nevertheless, by April 2012 SLEIS was successfully deployed on the servers of all six agencies.

Several of the agencies chose to use SLEIS to collect their 2011 emissions inventories and were the trail-blazers in discovering the remaining kinks and bugs in SLEIS, for which those agencies who deferred using it until the 2012 inventory cycle are grateful.

Several factors contributed to the successful outcome of this project:

- Staff in EPA's Emission Inventory and Analysis Group (EIAG) were willing and able provide whatever support the consortium agencies required;
- The Exchange Network's goal of providing funding to facilitate national data flows;
- The willingness of the ADEQ to manage the grant;
- The contractor's insistence on bringing the stakeholders – including industry representatives – into the development process at each critical stage.
- And perhaps most important, the willingness and ability of the member agencies to dedicate the time necessary; to collaborate and to be able to see beyond purely local needs; and to recognize that the system had to work for everyone. Without clearly identifying what the system was expected to do, and prioritizing our expectations, we could not have achieved nearly as good a result as we currently have.

References

1. Williams, Lori *"i*-STEPS Development For State And Local Agencies,"* Presented at the 12th Emissions Inventory Conference of the U.S. Environmental Protection Agency, San Diego, CA, April 29 – May 1, 2003
2. *Fiscal Year 2009 National Environmental Information Exchange Network Grant Program Solicitation Notice*, Information Exchange Partnership Branch, Office of

Environmental Information, U.S. Environmental Protection Agency, September 2008, pp entire document

3. Benedict, John A. October, 2008, West Virginia Department of Environmental Protection, Exchange Network support Letter, Charleston, WV, *example letter*
4. Travers, Linda A., March, 2009, *Exchange Network grant awarded letter*
5. Braun, Heinz, July, 2008 *i*-STEPS *replacement system minimum needs list from ADEQ*
6. Strawman email from WV email and attachment 20080819
7. *Betterton, Robert J., March, 2009, Final Strawman version "Strawman-Amended 20090309.xls"*
8 State of Arkansas Procurement Law and Rules, Office of State Procurement, Department of Finance and Administration, Little Rock, AR, September 2007, *Arkansas RFQ method from AK Office of Procurement,* page 18.
9 Lyon, David, August 21, 2009, "revised RFQ and Strawman," *email in which ADEQ requests each Consortium agency to approve the draft RFQ*
10 *State of Arkansas, Office of State Procurement*, *Request for Qualifications*, September 2009, pp 9-11 and pp 12 – 13
11 Lyon, David, September 25, 2009, "Vendor Evaluation Committee," email from ADEQ to form vendor selection committee

Key Words and Acronyms

ADEQ Arkansas Department of Environmental Quality

AFS U.S. EPA's AIRS Facility Subsystem. A precursor to the current Emissions Inventory System. AFS contained both emissions inventory and compliance data. It was a component of EPA's AIRS system.

AIRS U.S. EPA's Aerometric Information Retrieval System. An attempt to consolidate all of U.S. EPA's air pollution data. It was conceived to eventually be a repository for all environmental data but for various reasons, the effort was finally abandoned.

ANSI The American National Standards Institute is a private non-profit organization that oversees the development of voluntary consensus standards for products.

CDX U.S. EPA's Central Data Exchange

CERS U.S. EPA's Consolidated Emissions Reporting Schema. The format state and local agencies must use to report emissions inventory data to EPA.

Consortium A collaboration of state and local agencies that used older emissions inventory software and that was formed to seek an Exchange Network grant to develop new software to enable electronic reporting of their data to EPA's Emissions Inventory System. The consortium consisted of the following state and local agencies:

- Arkansas Department of Environmental Quality
- Arizona Department of Environmental Quality
- Delaware Department of Natural Resources and Environmental Control
- Nashville/Davidson County Metro Public Health Department, Pollution Control Division

- New Hampshire Department of Environmental Services
- West Virginia Department of Environmental Protection

CROMERR   U.S. EPA's Cross-Media Electronic Reporting Regulation

EIS   U.S. EPA's Emissions Inventory System

Exchange Network   A partnership between States, Territories, Tribes, and the U.S. EPA to facilitate the exchange of environmental information.

i-STEPS   Emissions inventory software designed to collect, manage and report data to U.S. EPA. It was designed to reflect the data structure of EPA's AIRS facility Subsystem and so was unsuited to manage data transfers to EPA's EIS database.

IT   Information Technology. According to Wikipedia, IT is the branch of engineering that deals with the use of computers to store, retrieve and transmit information.

MS SQL   A relational database management system used by several of the Consortium agencies on their servers.

NEI   U.S. EPA's National Emission Inventory system. This was the predecessor of U.S. EPA's current EIS.

NIF   National Emissions Inventory Input Format. This was the data structure required for reporting data to U.S. EPA's NEI.

Node   A node is a network partner's point of presence on the Exchange Network. It is software that securely initiates and responds to requests for information.

Node Client   A node client is an alternative to a full node. The chief difference between a full node and a node client is that a node client cannot respond to data queries from other nodes.

Oracle   An object-relational database management system used by several of the Consortium agencies on their servers.

RFP   Request for Proposals. RFPs are part of standard procurement process to identify vendors suitable for providing goods and services. As employed by the Arkansas Office for State Procurement the key difference between RFPs and RFQs is the importance placed on cost. For RFPs, cost is the primary consideration while for RFQs, contractor qualifications are the highest priority.

RFQ   Request for Qualifications. As employed by the Arkansas Office for State Procurement the key difference between RFPs and RFQs is the importance placed on cost. For RFPs, cost is the primary consideration while for RFQs, contractor qualifications are the highest priority. RFQ is the preferred process of the Arkansas Office for State Procurement when the qualifications or specialized expertise of the vendor is the most important factor in selection.

SLEIS   State and Local Emissions Inventory System. A web-based emissions inventory system developed by the SLEIS Consortium to collect, manage, and report data to U.S. EPA.

SQL Injection Attack   According to Wikipedia, SQL injection is a technique often used to attack databases through a website. It is a code injection technique that exploits

security vulnerabilities in a website's software to change the database content or dump the database information such as credit card information or passwords to the attacker.

Strawman   According to Wikipedia, a Strawman proposal is intended to generate discussion among team members of its pros and cons and to provoke new and better proposals. Often a Strawman will be prepared prior to kicking off a larger project, to begin discussions with a document that is likely to contain many but not all of the key aspects necessary for the project's successful completion.

XML   Extensible Markup Language. A markup language similar to HTML, designed to transport and store data.