WESTERN REGIONAL AIR PARTNERSHIP

EMISSIONS DATA MANAGEMENT SYSTEM

Potential Tasks

DRAFT

PECHAN

5528-B Hempstead Way
Springfield, VA 22151

703-813-6700 telephone
703-813-6729 facsimile

3622 Lyckan Parkway
Suite 2002
Durham, NC 27707

919-493-3144 telephone
919-493-3182 facsimile

P.O. Box 1345
El Dorado, CA 95623

530-295-2995 telephone
530-295-2999 facsimile

Table of Contents

Introduction

The Emissions Data Management System (EDMS) is an emission inventory data warehouse and web-based application that provides a consistent approach to regional emissions tracking to meet the requirements for State Implementation Plan (SIP) and Tribal Implementation Plan (TIP) development and periodic review and updates. The EDMS serves as a central regional emissions inventory database and associated software to facilitate the data collection efforts for regional modeling, Section 309 tracking and resulting data analyses. The EDMS is used for air quality modeling in pursuit of meeting the requirements of the United States Environmental Protection Agency's (EPA) regional haze rule (RHR), and for technical and policy evaluations by WRAP members, stakeholders, and other interested parties in the region.

Current Status

The EDMS has been in continuous operation since the January 17, 2005 rollout. There are currently 165 users registered. The database contains eight inventories and occupies about 80 Gigabytes of disk space.

The distribution of activities conducted in the January – July period is shown in Figure 1. Specific activities are detailed in the DBA reports prepared and reviewed with the WRAP EDMS Steering Committee each month. These reports are available on the Documents section of the project website (http://projects.pechan.com/edms).

Regarding the categories of activity shown in Figure 1, Database Maintenance entails modifications to and performance tuning of the database. Application administration may entail modifications to the EDMS software and keeping the interface coordinated with the data. Data Loading addresses the DBA-initiated activities of adding data to the database. One significant finding in operating the EDMS to date is that DBA-initiated data loading plays a greater role in overall DBA activities than initially envisioned. This situation is due in large part to the significant presence of contractor-prepared inventories in each emissions sector (such as the Fire sector). Data remediation entails correcting data in coordination with data providers, notably resolving potential overlaps between tribal inventories and the neighboring jurisdictions. Opportunities for such data remediation will continue in the coming year. Project Administration includes monitoring, reporting, and management activities. This activity includes significant tracking activities as described in the DBA Reports (see above) as well as traffic monitoring of the site. User support entails assisting users with accessing the EDMS and its data, and beginning in August includes the preparation of the EDMS User Bulletin, a proactive measure intended to aid users and potential users with the EDMS.
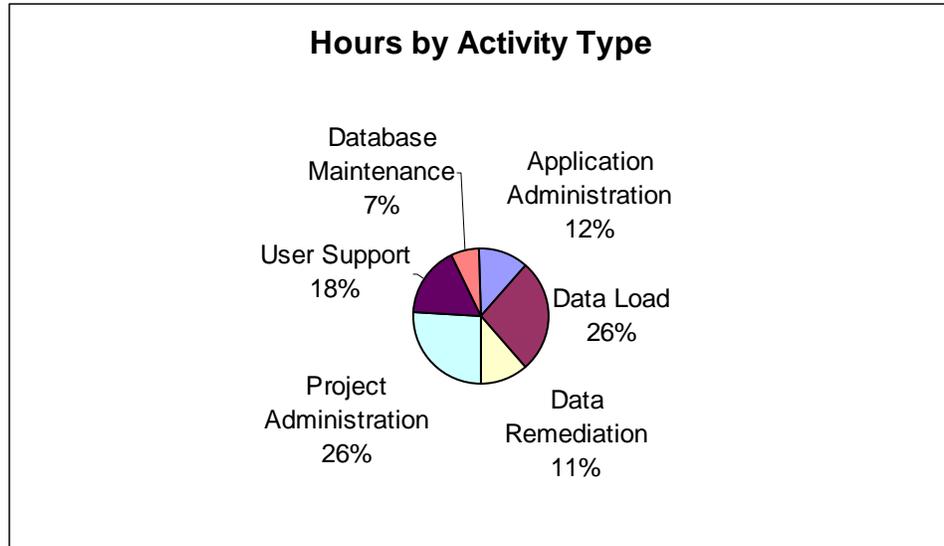
Hours by Activity Type

Database Maintenance 7%

Application Administration 12%

User Support 18%

Data Load 26%

Project Administration 26%

Data Remediation 11%

Figure 1: Utilization of Hours

Future Activities

Entering the second year of production, EDMS will continue to be the emissions repository for the WRAP providing a springboard to analyses and decision-making. Future year inventories will be prepared, loaded, and supported in the EDMS, and the user interface will be refined according to the WRAP's needs. Continued opportunities for data remediation will be available.

The following sections describe enhancements and tasking for the ongoing maintenance, upkeep, and enhancement of the EDMS. The enhancements have been compiled from various sources and are presented in priority order. A summary table with cost and comments appears at the end of the document.

2005 Hosting Supplement

As described in the DBA Reports during 2005, the role, nature, and volume of the work executed by the DBA in 2005 varies from the estimates prepared in mid-2004 before system roll-out.   As Shown in Figure 2, the current estimate shows that the DBA resources will be depleted by October 25, 2005. The supplement will increase the DBA budget for the current contract period. The supplement would allow continuation of DBA services without interruption. Unused funds would be available for application to 2006 activities as directed by the Steering Committee.

The average monthly expense through July 2005 is $15,243. Pechan recommends a supplement of two and one-half average months ($38,100) to allow for uninterrupted DBA coverage from mid-October through December.
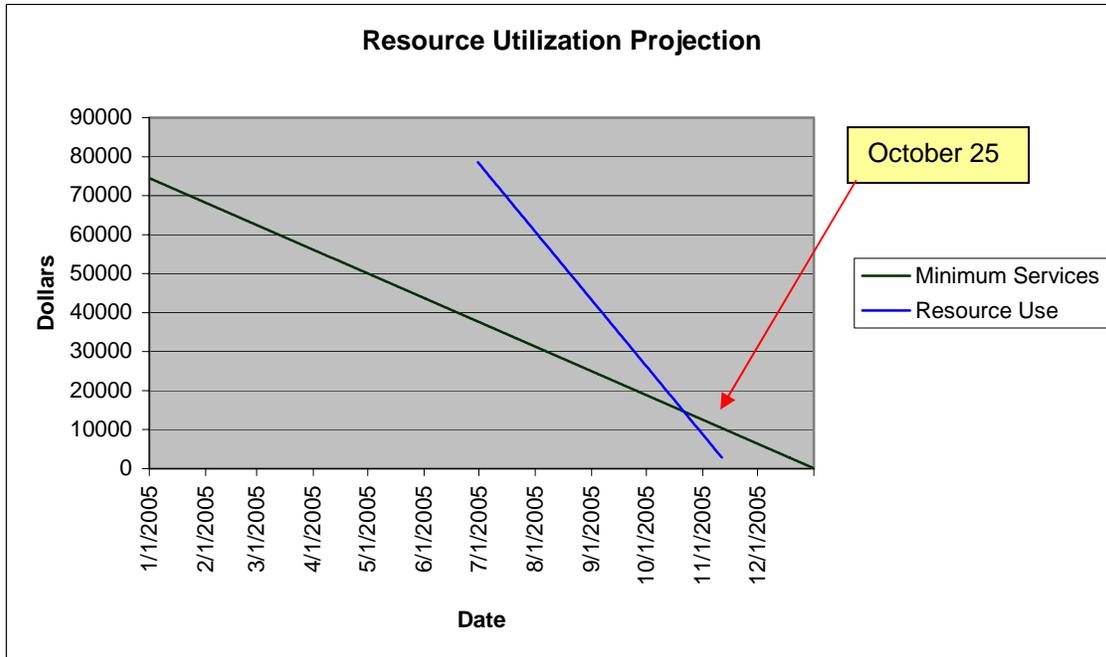
Resource Utilization Projection

Figure 2: Resource Utilization Projection

Hosting 2006

1) Infrastructure

This task includes hosting and providing maintenance on the database, maintaining the database server, maintaining the web server, and maintaining the application, application support, connectivity, systems security and disaster recovery. Pechan proposes to continue to house the system and data at the University of North Carolina – Chapel Hill.

Estimate: $58,400

2) DBA Support

This task covers loading of and management of data; user support; database tuning; administrative support (conference calls); status reporting; and upkeep of project website. DBA support will be important to the ongoing process of adding modeled- and future year inventories to the EDMS for analysis and rule development, as an interface to the public and scientific communities for WRAP emissions information, and for accommodating the needs of users as the content and complexity of the housed data grows.

Estimate: $132,000

NIF 4.0 Compliance

This activity entails upgrading the database by modifying the structure of many of the existing EDMS tables to make them compatible with the newly disseminated NIF 4.0 specifications. Notable changes to the data structure include:

- the addition of a new table in each sector to house contact information for data sources;
- a new sector to accommodate simplified annual emissions reporting for SITE-Level HAP Emissions, Airports and Feedlots (HAP and CAP), and Smaller Point Sources (HAP and CAP); and
- a new data structure for housing fire data (not yet released).

The NIF 4 Specifications are available at http://www.epa.gov/ttn/chief/nif/nif4.html. Adapting this new standard will entail modifying the existing data storage mechanisms in the EDMS (ORACLE tables and materialized views).

As a result of these changes in the database, modifications will be required in the standard upload routine, the NIF and Ad Hoc exports, the SMOKE export, and the views associated with standards reports.   These programs are written to interact with the existing data structure and will need to be modified to in order to work properly with the new table structures. Pechan will estimate the cost of implementing the fire data structure modifications once the EPA format is released.

Estimate: $26,900

Training

The following events are estimated as separate trips. Some economies will be available if both training events are offered on a single trip.

1) General User Training

Provide two half-day training events for general users/data analysts, entailing system setup and access; standard report interface; GIS interface; Ad hoc, NIF, and SMOKE exports, documentation, and help. Entails travel, overnight stay, and one day on-site.

Estimate: $5,400

2) Data Provider Training

Provide 1 day training for data providers, including all subject matter above plus data file preparation, uploading data, the data status interface, diagnostic feedback, and data correction. Entails travel, overnight stay, and one day on-site.
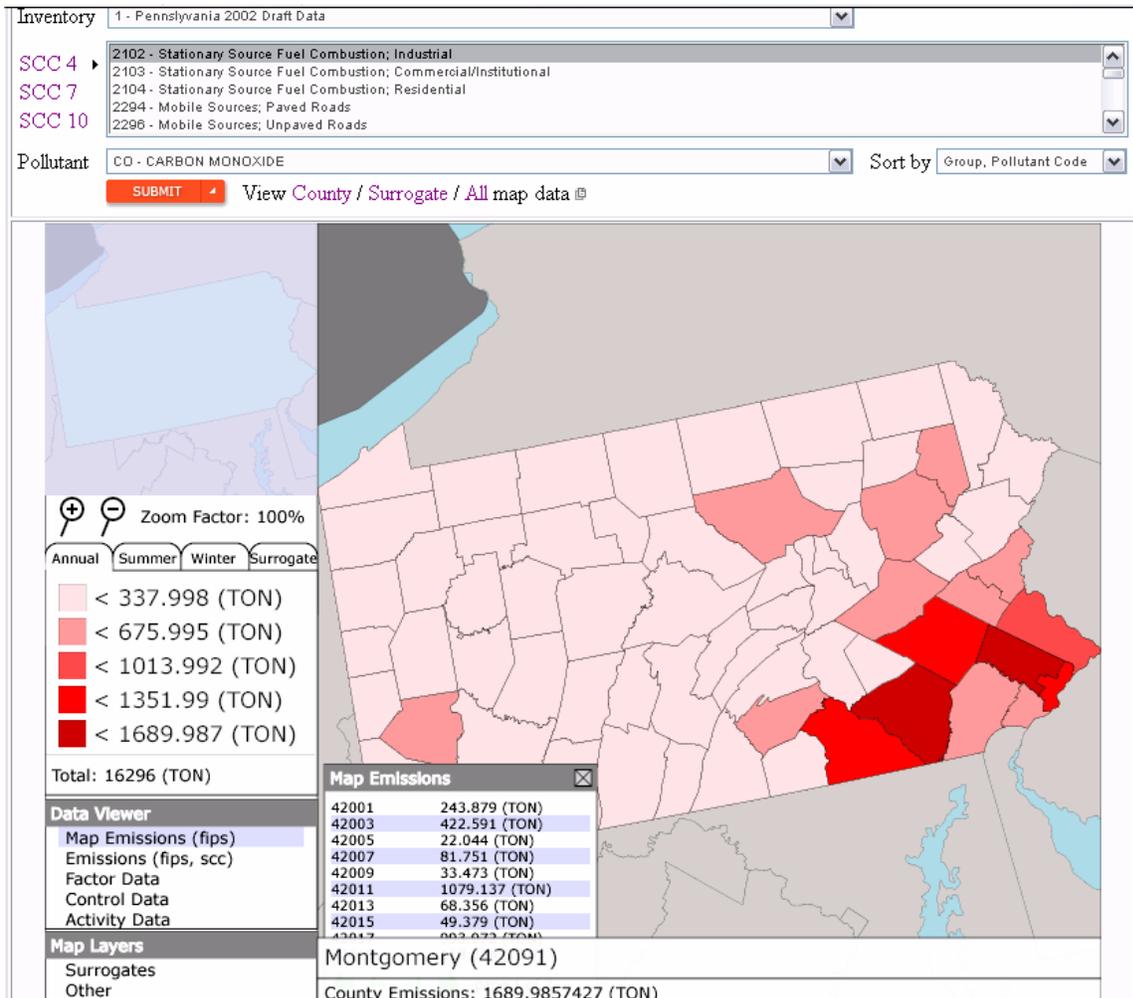
Estimate: $5,400

Figure 3: Color-graded Maps

Color-graded maps

Enhance the GIS interface to allow for the presentation of maps that indicate emission by county/tribe using a color grading system, as shown in Figure 3. This approach to GIS portrayal facilitates the visual identification of trends, groupings, minimums/maximums and data quality. An example screen shot is shown below that depicts the county-level CO emissions for a specific SCC grouping (Stationary Source Industrial Fuel Combustion) in the State of Pennsylvania. As seen in the map below, it is easy to interpret that the CO emissions for the selected SCC are concentrated around the Philadelphia area and nearby counties as well as Pittsburgh.

This initiative includes revising the existing GIS interface to streamline user interaction.

Estimate: $9,900

BART Compliance

The WRAP is actively engaged in tracking BART-related information. The capability to harbor basic BART eligibility information is provided by the NIF 4.0 modifications described above. Specifically, the Emission Unit table has added fields for BART Eligibility Status (i.e., S/L/T has or has not identified site as BART –eligible) and BART Category Code (a code describing which of the approximately 30 major source categories applicable to BART initiatives is relevant). For the WRAP EDMS to make use of these fields, the interface must be modified so that the BART data is used as a part of the query analysis. The following tasks address optional modifications that will assist users in isolating and viewing BART-related data.

1) Add standard reports reflecting BART-eligibility status

This task requires the development of a new report and a materialized view to support it. The data characterizing BART eligibility is entailed in the NIF 4.0 specification. Users would have the ability to report emissions, designated BART eligibility status and/or source category. This report would allow users to assess the condition of the assigned eligibility status information while seeing the emissions associated with the source.

Estimate: $4,300

2) Modify the ad hoc report interface

This task entails adding a parameter to the ad-hoc query interface to allow selection based on BART eligibility. Users would then have the ability to refine their ad-hoc query based on the BART eligibility status and/or source category, limiting the result set to the facilities or emission units of interest.

Estimate: $4,300

Enhancements Identified from Acceptance Plan

There are currently 20 issues marked as potential enhancements that were identified during the EDMS Beta testing effort. These issues were identified in the EDMS Acceptance Plan and are shown in Table 1 below (two pages). Time and cost estimates should be considered 'ballpark' and not heavily researched. The enhancements that appear below are thought to be outside of the original design.

Estimate: $26,410 total

Description	Time Estimate (hours)	Cost Estimate (dollars)	Demand/ Importance
Add a 'Back' button on submitted data summary screen to facilitate submission of several files.	8 programmer; 1 DBA	$678	Useful addition, however, no demand to date
Tabular report suggestions: Add user ability to change the filter parameters in the Tabular data view and not have to go back to the graphical chart view; add user ability to select more than one county (and less than all counties) in a state to view on the graphs and tables; add user ability to view state totals without viewing county totals also.	16 programmer; 8 DBA	$2,064	Useful addition, however, no demand to date
Efficiency on Extraction Transfer Loading (ETL) from Transaction Database (TXN) to Staging Database (STG) - driver script needs review to improve efficiency, currently Record Add/Record Delete and Delete steps commented out in production since they are not needed.	8 programmer; 8 DBA	$1,504	Important
Change return of ETL and diagnose procedure from number to error message. Use production master diagnose as guide.	16 programmer; 2 DBA	$1,356	Important
Diagnose flags QC check not scaling well for very large files, review to improve efficiency.	8 programmer; 8 DBA	$1,504	Important
state/tribal names - make sure the differentiating part is early in the string expression so that it will be useful in pull downs	4 programmer; 1 DBA	$398	Important
Modify the function that creates Excel and Access export files to produce null valued fields rather than zero-valued fields where no data is reported.	20 programmer; 8 DBA	NA	Already completed
GIS – provide bigger border for states so that states can be differentiated from counties when zoomed in.	8 programmer; 1 DBA	$678	Useful addition, however, no demand to date
GIS – Add tool tips on GIS buttons	8 programmer; 1 DBA	$678	Useful addition, however, no demand to date
Disaggregate information in NAME column on standard reports, currently contains name, address, other values in one field.	8 programmer; 2 DBA	$796	No demand to date
Provide checks that data owner has submitted data for only their own jurisdiction	32 programmer; 16 DBA	$4,128	Useful addition, however, no demand to date

Description	Time Estimate (hours)	Cost Estimate (dollars)	Demand/ Importance
Write jpeg files generated on the fly to temporary storage so that they can be exported normally, allowing users to open directly rather than requiring them to save to disk first.	8 programmer; 2 DBA	$796	No demand to date
Change spacing near all colons (:)	6 programmer; 1 DBA	$538	No demand to date
SVG may not work with IE 5.0 on a MAC	32 programmer; 16 DBA	$4,128	No demand to date
Section 508 compliance – graphics portrayed with patterns instead of colors, all-text versioning.	If pursued, more definition required.		No demand to date
Switched to Tabular view without hitting "go"	20 programmer; 4 DBA	$1,872	No demand to date
GIS – combine select and update into one button click	16 programmer; 4 DBA	$1,592	This enhancement would be covered in Color-graded Maps.
Timeout message needed	8 programmer; 2 DBA	$796	No demand to date
"Export /PDF" function for bar charts produces charts with hollow rather than filled bars	8 programmer; 4 DBA	$1,032	No demand to date
GIS - Import/Export/Edit list of selected features	20 programmer; 4 DBA	$1,872	No demand to date
TOTAL		$26,410	

Table 1: Enhancements from the Acceptance Plan

Enhance Facility GIS Display

Reduce the overall number of facilities manipulated by the GIS interface so that performance is not taxed. The facilities to be presented might be limited by emissions volume, such as:

- Facilities with emissions greater than X for any pollutant - value x to be fixed rather than user-prescribed. It is estimated that this functionality can be added for 20 hours programming time plus 4 hours DBA time ($1,872).
- Top X% facilities in WRAP region for specific pollutant. Value x to be fixed rather than user-prescribed; pollutant to be selected by user from pick list. It is estimated that this functionality can be added for 32 hours programming time plus 8 hours DBA time (~$2,392).
- Filter Facilities based on SIC Code. It is estimated that this functionality can be added for 32 hours programming time plus 8 hours DBA time (~$2,392).

- Filter Facilities based on tiered SCC code, similarly to standard reports functionality. It is estimated that this functionality can be added for 40 hours programming time plus 10 hours DBA time (~$2,990).

Estimate: $9,646.

Low Graphics Version of EDMS

Description/Deliverable: Provide users without high-speed Internet connections an attractive and intuitive interface to view, query, and report EDMS data

Benefits: Would allow users that do not have high speed to access data more easily thus improving access/communication of data to certain stakeholders. This may be of more benefit to tribal users that may not have high-speed computer access as well as other stakeholders and public users.

Strategic Plan Timing Issues: Does not help to meet any strategic planning milestone.

Estimate: $30,000

Method for Biogenic/Dust Feedback Loop

Description/Deliverable: This task entails devising a method to return required revisions to modeled outputs concerning biogenic and dust emissions back to the relevant model inputs. This outcome of this task is more likely to be a statement of protocol rather than specific modifications to functionality of EDMS or other systems.

Benefits: If states/tribes provide biogenic or dust emissions, this method would be a first step at getting those emissions/activities back to the RMC. At this time the RMC would not have the disaggregated information coming from EDMS to feed back into their process.

Strategic Plan Timing Issues: Does not help to meet any strategic planning milestone, would improve data flow between EDMS and RMC.

Estimate: $20,000

Capability to Geo-Code Certain Area Source Categories

Description/Deliverable: Entails minor modifications to database and supplementary data submittal formats, as well as data uptake system and GIS display routines.

Benefits: Would allow for certain area sources to be geo-coded in the database (e.g. landfills, minor point sources).

Strategic Plan Timing Issues: Could provide useful geo-information for attribution and control analyses, etc. scheduled for 2005-2006.

Estimate: $20,000

Summary

The following table summarized the potential tasks.

Potential Task	Estimate	Demand/Importance
2005 Hosting Supplement	$38,100	Imperative
Hosting		Imperative
Infrastructure	$58,400	
DBA Support	$132,000	
NIF 4.0 Compliance	$26,900	Imperative
Training		Important since most users have not been trained; will promote use.
General User	$5,400	
Data Provider	$5,400	
Color-graded Maps	$9,900	Important – will help to meet users' needs.
BART Compliance		Unclear – importance of program and method of managing information is evolving.
Standard Report	$4,300	
Modify Ad-hoc interface	$4,300	
Enhancements Identified from Acceptance Plan	$26,410	Detailed in Table 1
Enhance Facility GIS Display	$9,646	Important
Low Graphics Version	$30,000	No demand to date.
Method for Biogenic/Dust Feedback Loop	$20,000	No demand to date.
Capability to Geo-code Certain Area Source Categories	$20,000	Airports and Feedlots now covered by NIF 4.0. No demand to date.
Total	$390,756	

Table 2: Estimate Summary

All non-hosting tasks can be completed within six months after initiation; most can be completed within 90 days. Pechan appreciates the opportunity to work with the WRAP on the EDMS. Pechan can provide estimates for additional or different tasks according to the wishes of the EDMS Steering Committee.