Pfizer's Air Quality Management System

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ABSTRACT

At Pfizer Inc.'s Global Research and Development (PGRD) site in Groton Connecticut, compliance with Title V and state air quality regulations only starts with the initial permit application; the ongoing record keeping and certification process has proven to be the far bigger challenge. The Air Quality Management System (AQMS) was developed to meet the PGRD-Groton specific needs for continuous compliance demonstration and for strategic planning.

AQMS meets three functional needs.

The first need is to verify permit compliance. The permit limitations for each emission unit are contained within the system. These limitations include not only emission thresholds, but also operational limitations such as hours of operation and material throughput.

The second need is to collect emission unit operation data, and to calculate and track emissions, based on that data. Emission information is collected from 10 different research unit areas via either Intranet or specialized Windows program interfaces. The AQMS was designed to not only provide the site's EHS group with the required air data but to also provide a value-added system for each department to streamline their daily business operations for data collection and reporting. The emission information from each business area is then collected, quality assured by the EHS group, and added to the master air quality database.

The third need is for compliance reporting. The AQMS system contains specific reports for each business area, including site-wide reports to meet internal corporate reporting needs, as well as state and Title V reporting requirements.

INTRODUCTION

At Pfizer Inc.'s Global Research and Development (PGRD) site in Groton Connecticut, compliance with Title V and state air quality regulations only starts with the initial permit application. The ongoing record keeping and certification process has proven to be the far bigger challenge. The existing systems that were in place collected air quality information from 10 different research unit areas. The existing systems consisted of various spreadsheets, Access

databases or manual logs that were cumbersome requiring data re-entry into different environmental systems to produce the required federal, state, corporate or internal reports.

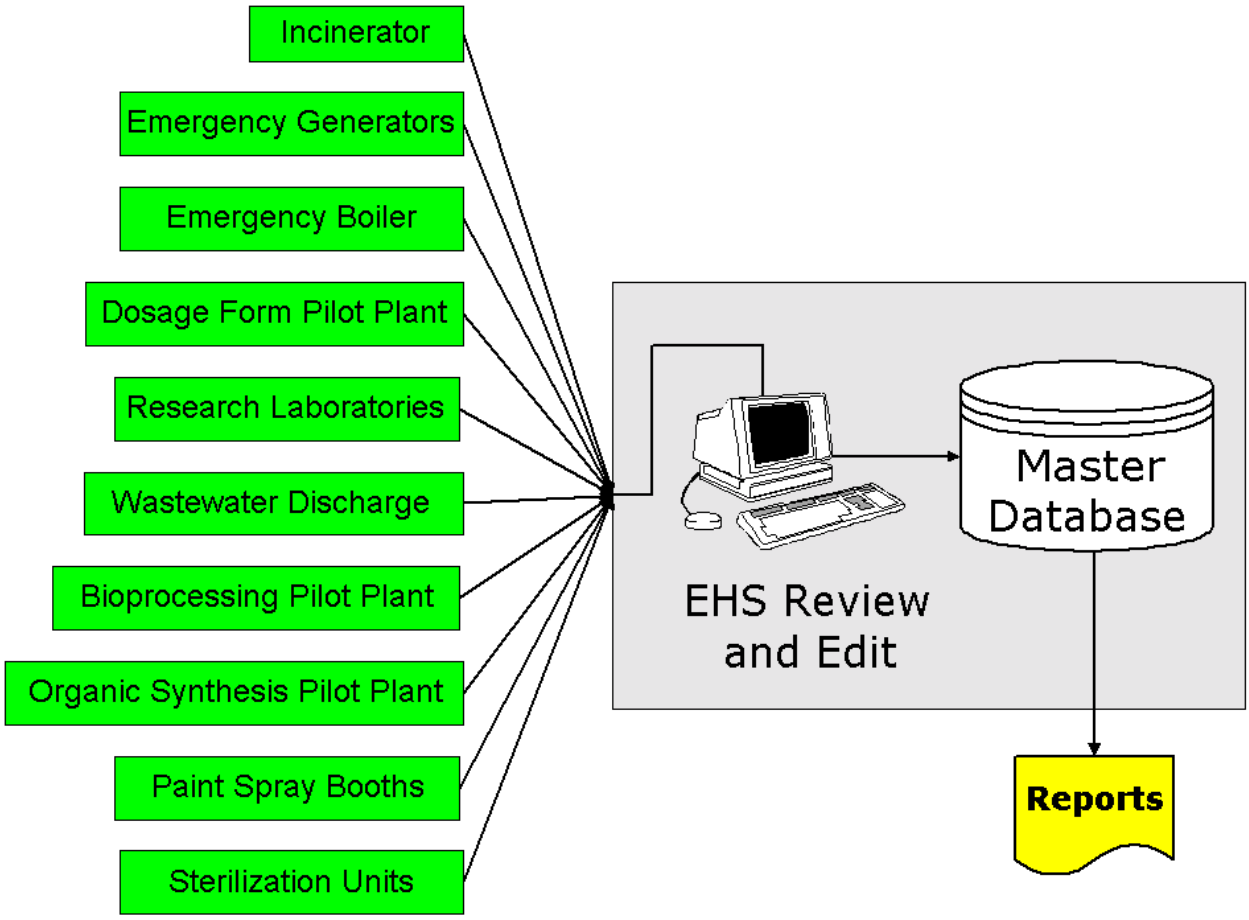
In order to streamline the existing air quality data collection and reporting system, the Air Quality Management System (AQMS) was developed to meet the PGRD-Groton specific needs for continuous compliance demonstration and for strategic planning. The goal of AQMS is to simplify the burden of collecting air quality data from the various research areas and provide a master air quality database to produce the required reports. The 10 research areas that provide air quality information are as follows:

- Incinerator
- Emergency Generators
- Emergency Boiler
- Dosage Form Pilot Plant
- Research Laboratories
- Wastewater Discharge
- Bioprocessing Pilot Plant
- Organic Synthesis Pilot Plant
- Paint Spray Booths
- Sterilization Units

A key part of AQMS is that the user friendly data input modules were designed with the assistance of each research area. After finding out the data analysis and reporting needs of each research area, modules were developed to collected the air quality data as well as other information requested by each research area. The modules that were developed provide a value added service to the research areas with additional data analysis and reports not readily available in previous systems.

Figure 1 shows the general structure of the Air Quality Management System.

Figure 1. General System Flow of the Air Quality Management System.



SYSTEM ARCHITECTURE

The Air Quality Management System enables EHS personnel to capture and process air quality data from across the facility and produce internal, EPA and state required reports. The system consists of the following:

- Intranet Modules
- Visual Basic Modules
- Reporting

The Intranet modules were developed for the research areas that have many users who will enter data. The Intranet component of AQMS consists of 5 modules:

- Sterilization Units
- Emergency Generators
- Paint Spray Booth
- Emergency Boiler
- Dosage Form Processing Pilot Plant

Each of these modules is accessed via a web browser (Netscape 4.x or Internet Explorer 5.x). These intranet screens allow entry of data by various users around the facility to provide air quality data to EHS as well as providing the user with a copy of the data sent to EHS. An example of the Emergency Generators intranet screens are shown in Figures 2 – 4.

Figure 2. Example - Emergency Generator Operating Log intranet screen

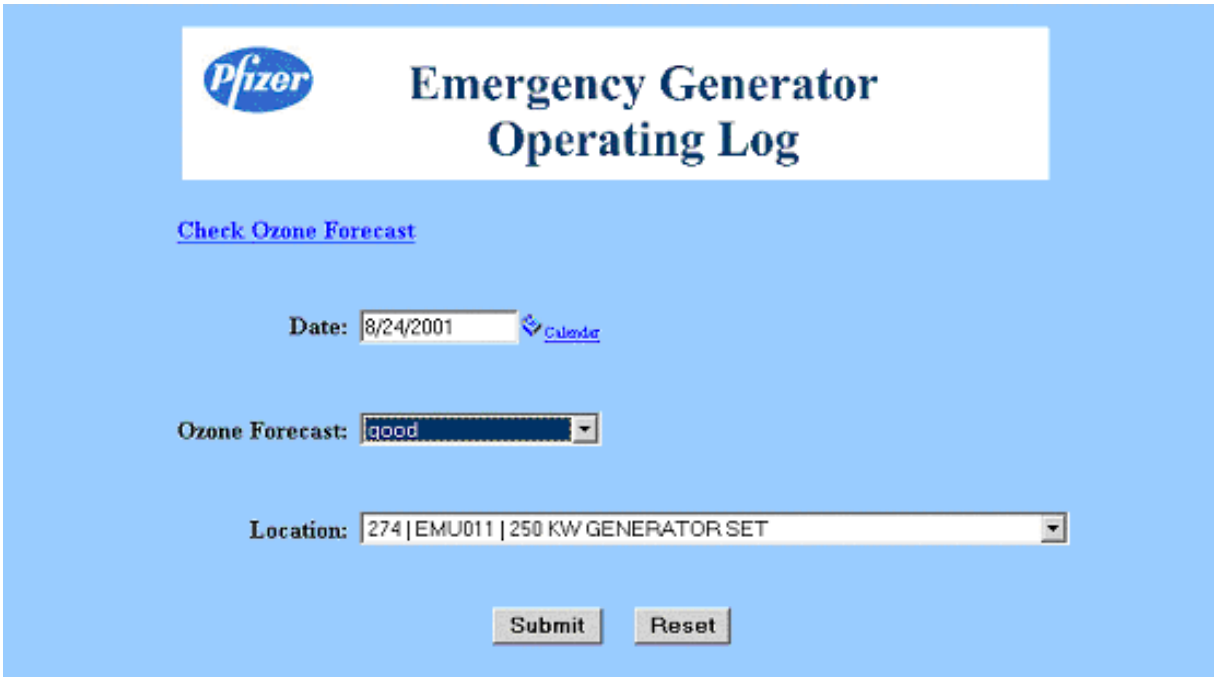


Figure 3. Example - Emergency Generator intranet screen.

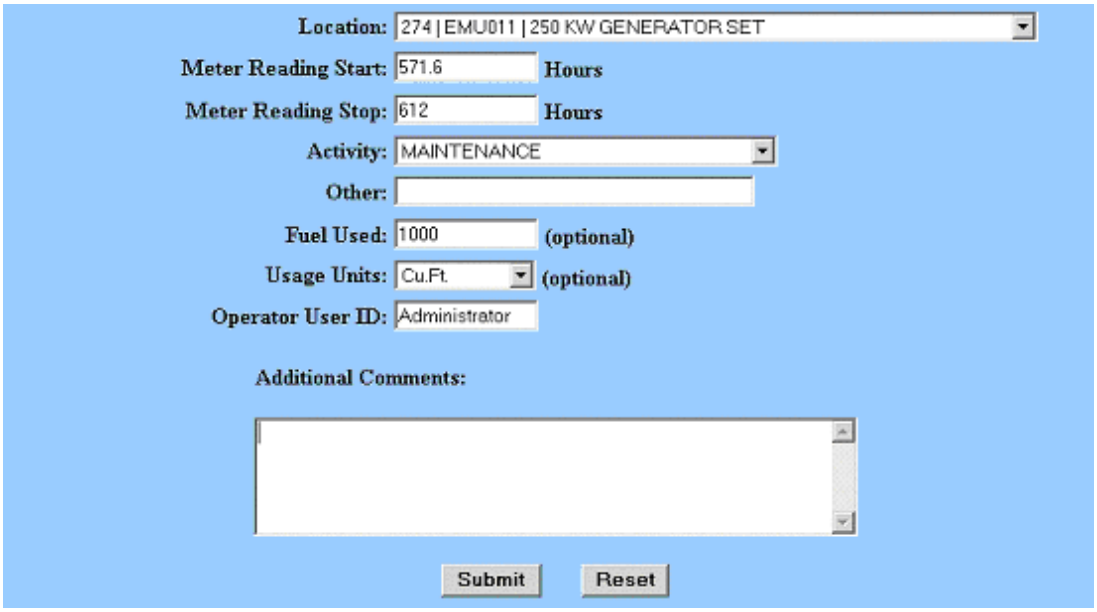
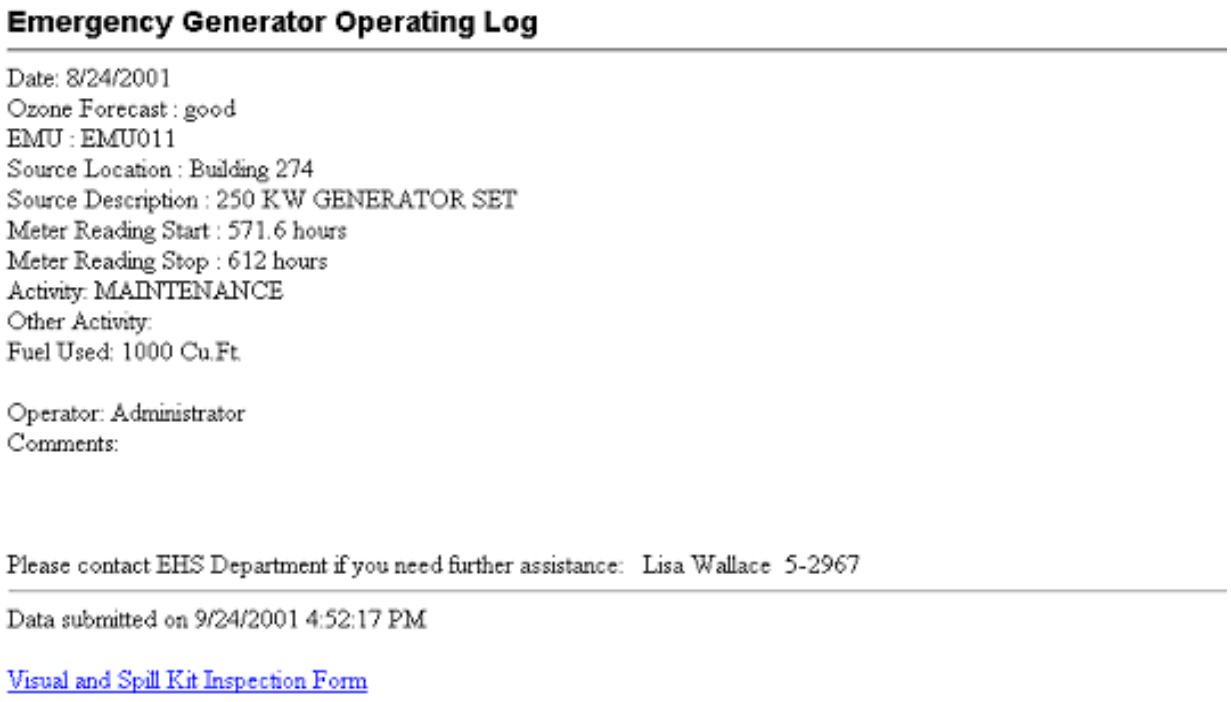


Figure 4. Example - Summary of intranet data entered by a user for an emergency generator.



Emergency Generator Operating Log

Date: 8/24/2001
Ozone Forecast : good
EMU : EMU011
Source Location : Building 274
Source Description : 250 KW GENERATOR SET
Meter Reading Start : 571.6 hours
Meter Reading Stop : 612 hours
Activity: MAINTENANCE
Other Activity:
Fuel Used: 1000 Cu.Ft.

Operator: Administrator
Comments:

Please contact EHS Department if you need further assistance: Lisa Wallace 5-2967

Data submitted on 9/24/2001 4:52:17 PM

Visual and Spill Kit Inspection Form

As the intranet air quality data is entered, the information is stored in a Quality Assurance database to be reviewed by EHS before being transferred to the master database.

AQMS modules that required more functionality / specialized processing capability were developed using Microsoft's Visual Basic. The Visual Basic modules consist of the following**:**

- Support Tables
- Organic Synthesis Pilot Plant Programs
- Bioprocessing Pilot Plant Programs
- Incinerator
- Wastewater Discharge
- Quality Assurance
- Master Table Editor
- Reports

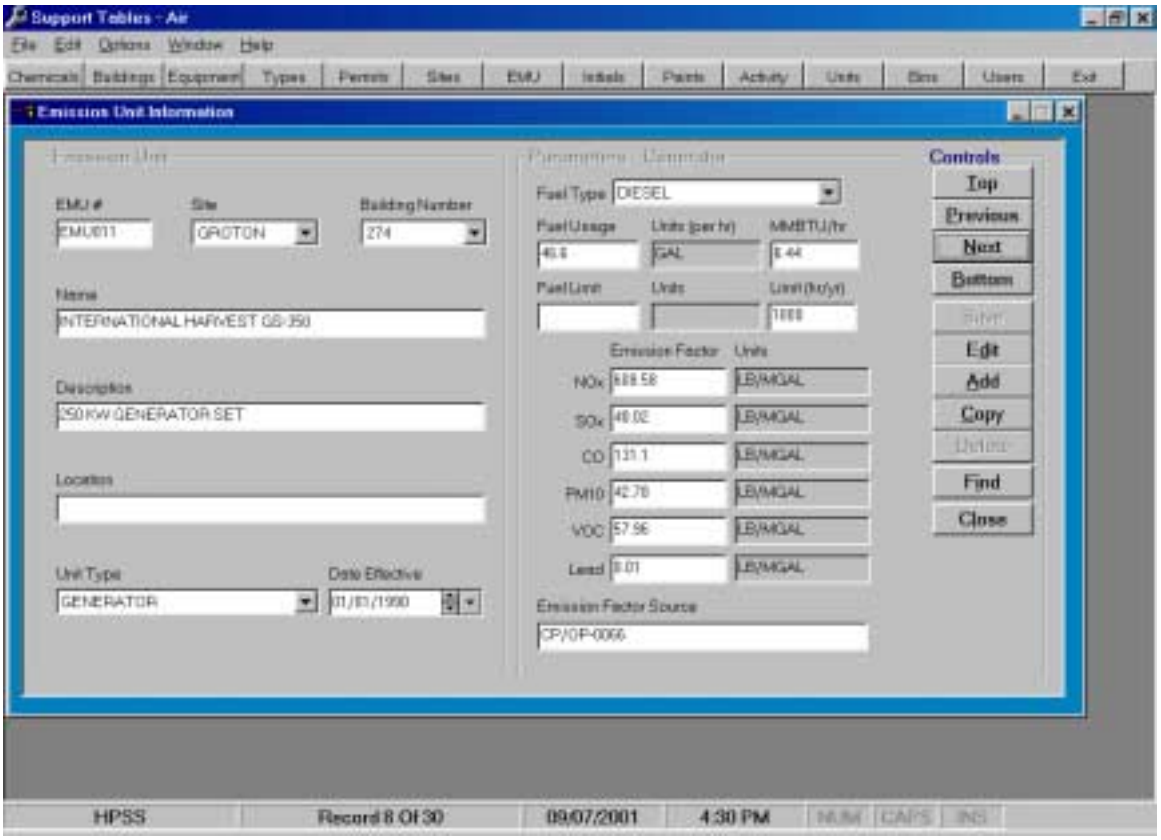
Support Tables

The Support Tables module is used to maintain the common databases used throughout AQMS as look-ups or drop lists. The support tables also contain security information regarding system and module access by users.

Figure 5 shows the Support Tables module with the Emission Unit table displayed.

The first need from AQMS is to verify permit compliance. The permit limitations for each emission unit are contained within this table. These limitations include not only emission thresholds, but also operational limitations such as hours of operation and are used through out the system for emission calculations and standards compliance.

Figure 5. Emission Unit Information table.



Visual Basic Research Area Programs

The Pilot Plants, Incinerator and Wastewater Discharge modules require complicated data entry, interaction with other existing Pfizer data systems and internal reports in addition to EHS' needs. To meet the needs of these research areas, specialized programs were designed with the goal to

simplify their data collection and reporting needs. EHS air quality data requirements are incorporated into these programs along with the other needs of the research area. Figures 6-7 show examples of the Incinerator Module's specialized input and reporting screens.

Figure 6. Data input screen for the Incinerator Module.

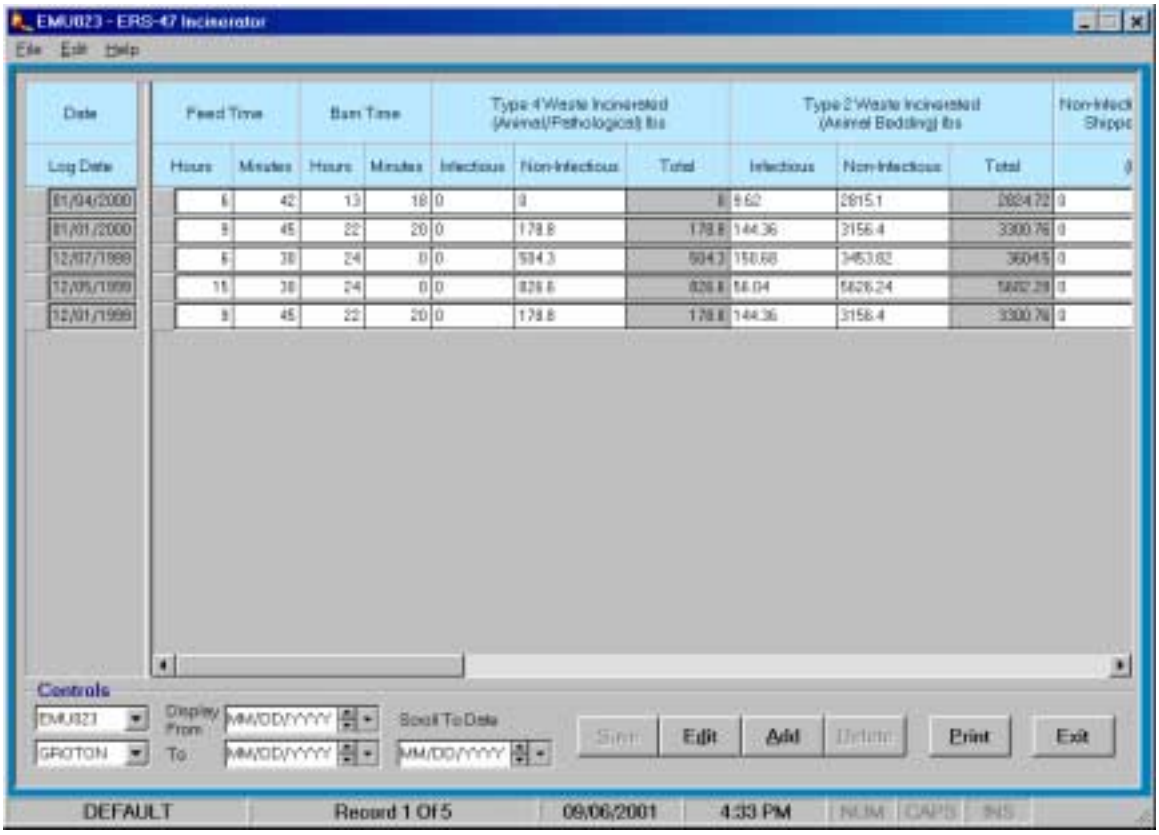
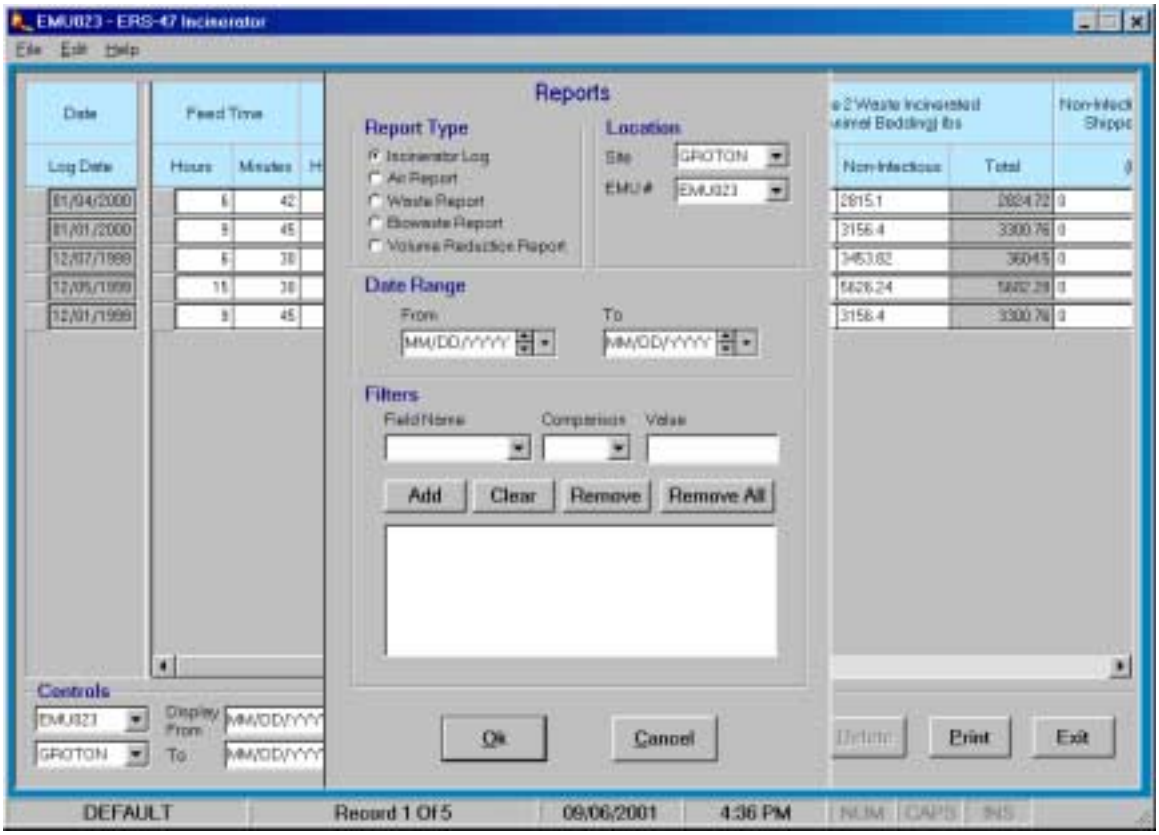


Figure 7. Data reporting screen for the Incinerator Module.

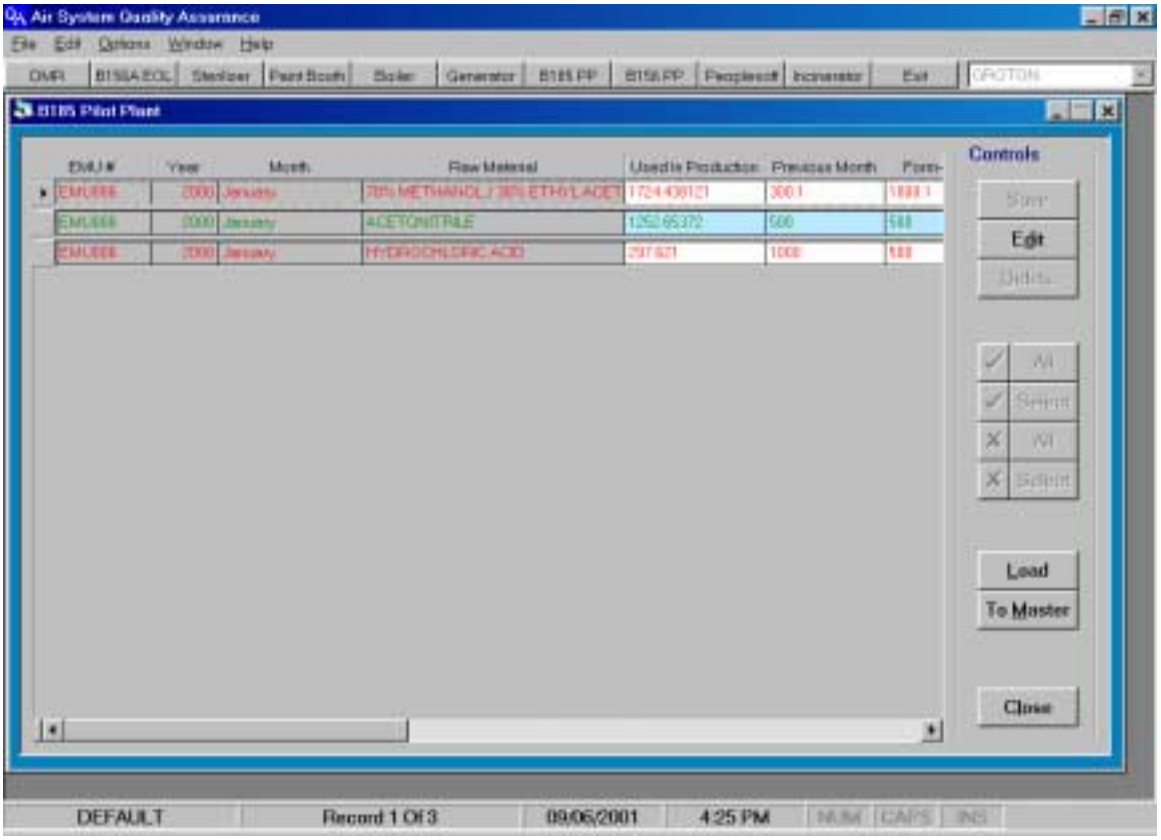


The data entered from each research area module is imported to EHS' Quality Assurance database for review and editing.

Quality Assurance Editor

All of the Air Quality Data that is entered by the research areas (intranet or Visual Basic programs) are stored in the quality assurance database. Before the air quality data can be used in the Reporting Module, EHS must quality assure the data. Figure 8 gives an example of the data in the Quality Assurance editor. Entries in red are raw data that has not been verified/checked by EHS. A green entry represents data that has been verified by EHS and is ready to be transferred to the master database. By pressing the "To Master" button all records that have been quality assured are moved to the master database.

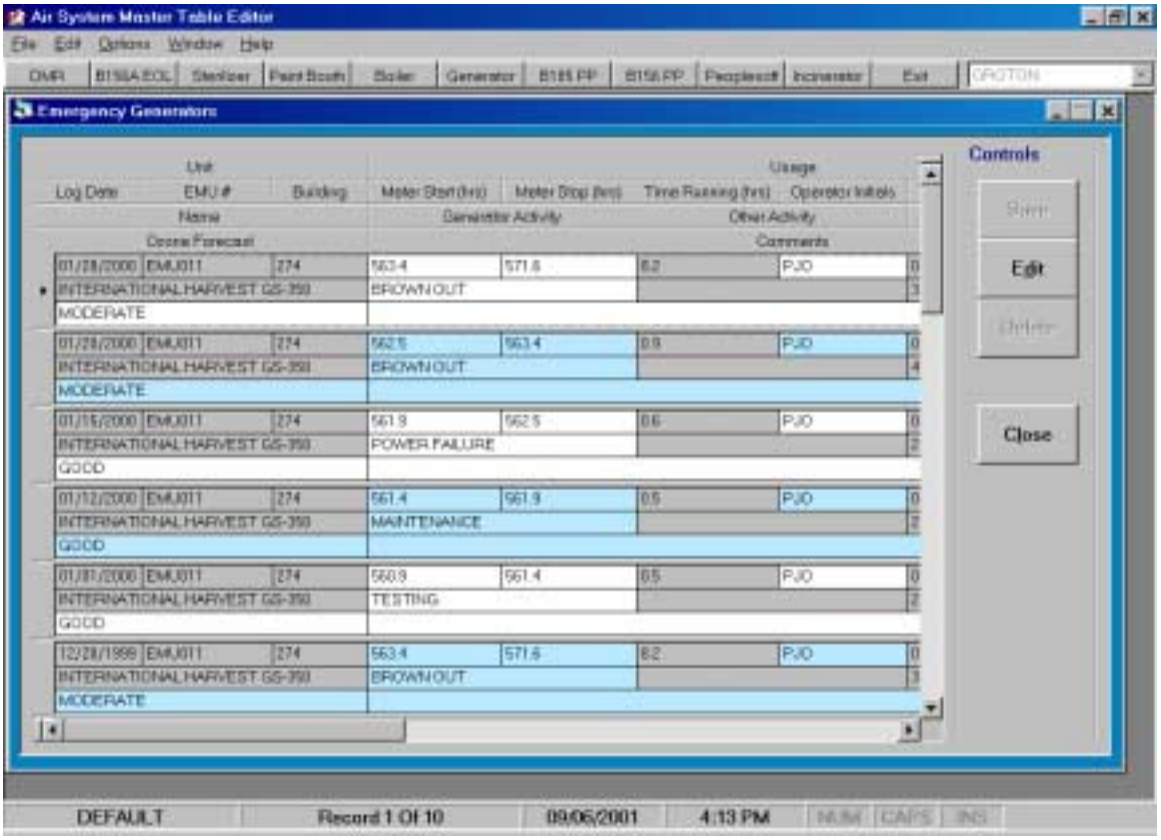
Figure 8. Quality Assurance module – Organic Synthesis Pilot Plant.



Master Table Editor

All quality assured air data resides in the master data tables. It is from these master tables that the EHS reports are generated. In the rare occasion when a change is required to made to data in the master table, the Master Table Editor module is used. This module is similar to the Quality Assurance Editor module and allows viewing of the data. Changes can be made to the data by EHS personnel. Figure 9 shows the Master Table Editor for the emergency generators.

Figure 9. Master Table Editor – Emergency Generators.



Reports

The reports module in AQMS is used to produce reports for each research area, Title V compliance, Pfizer corporate and the State. The reports are produced using Crystal Decision's Crystal Reports and each report can be previewed on the screen before printing. Figures 10 – 11 show the various reports for Title V and State reporting requirements. Figure 12 shows an example printout from the reports section as previewed to the screen.

Figure 10. Title V Reports

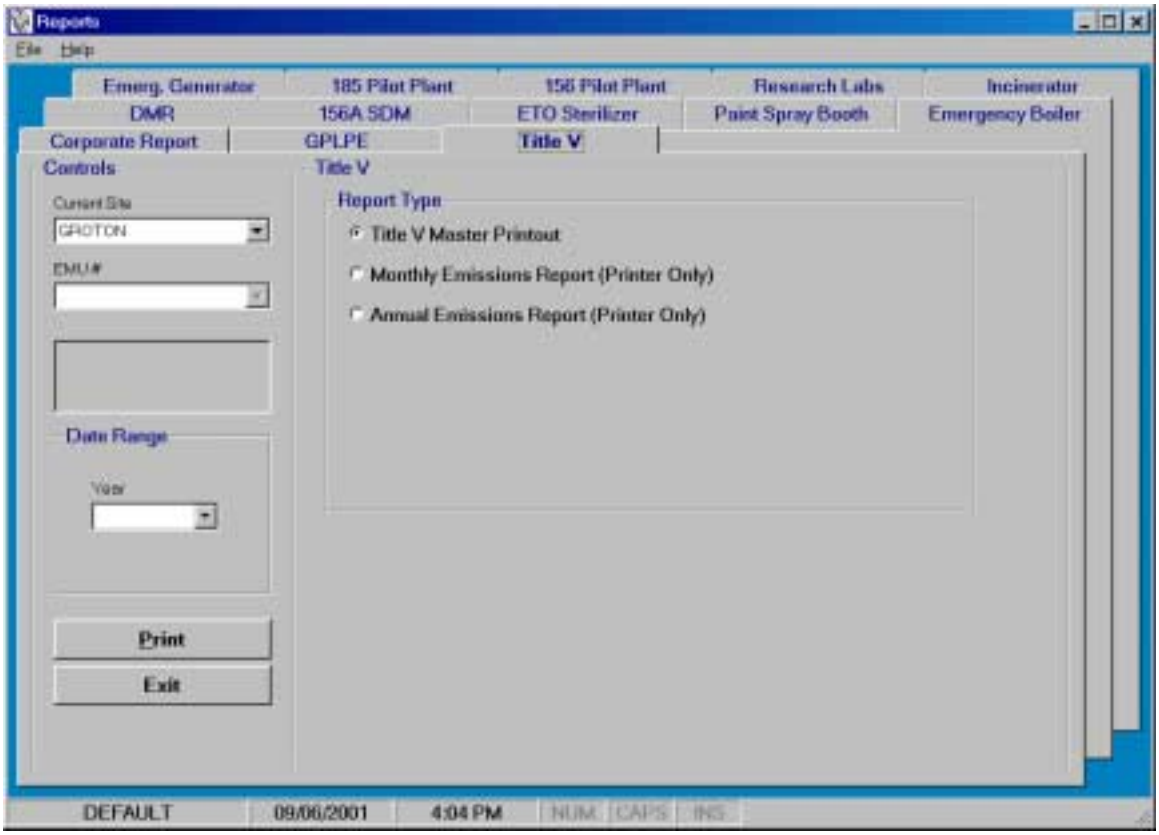


Figure 11. State Required Reports.

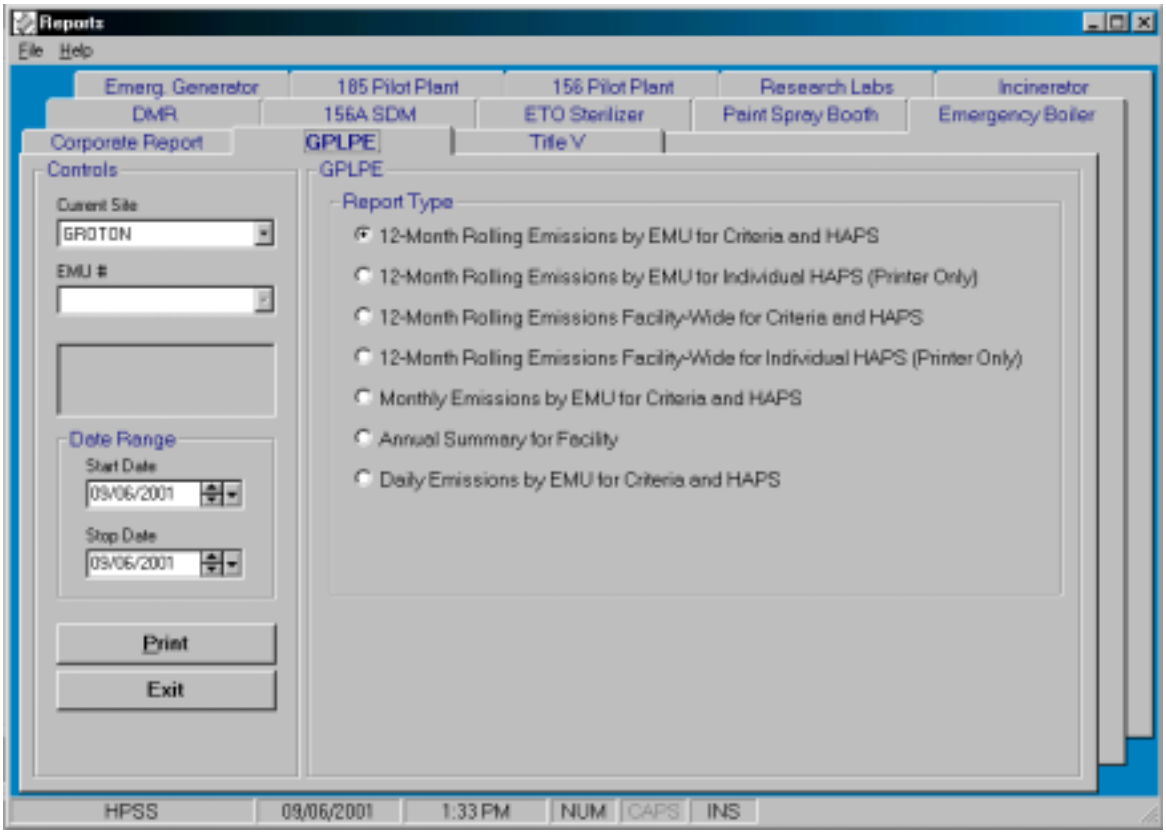
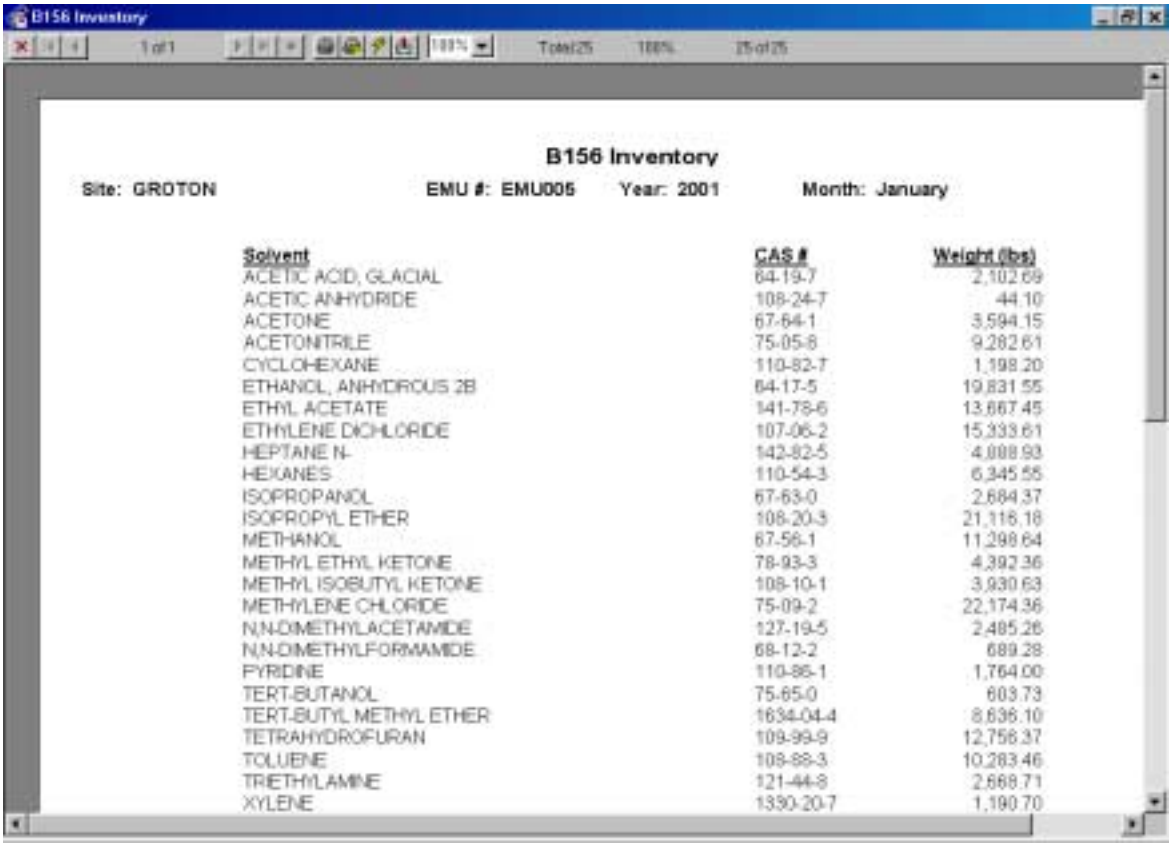


Figure 12. Example Report viewed to the screen.



B156 Inventory

Site: GROTON EMU #: EMU005 Year: 2001 Month: January

Solvent	CAS #	Weight (lbs)
ACETIC ACID, GLACIAL	64-19-7	2,102.69
ACETIC ANHYDRIDE	108-24-7	44.10
ACETONE	67-64-1	3,594.15
ACETONITRILE	75-05-8	9,282.61
CYCLOHEXANE	110-82-7	1,198.20
ETHANOL, ANHYDROUS 2B	64-17-5	19,831.55
ETHYL ACETATE	141-78-6	13,667.45
ETHYLENE DICHLORIDE	107-06-2	15,333.61
HEPTANE N-	142-82-5	4,888.93
HEXANES	110-54-3	6,345.55
ISOPROPANOL	67-63-0	2,684.37
ISOPROPYL ETHER	108-20-3	21,116.18
METHANOL	67-56-1	11,298.64
METHYL ETHYL KETONE	78-93-3	4,392.36
METHYL ISOBUTYL KETONE	108-10-1	3,930.63
METHYLENE CHLORIDE	75-09-2	22,174.36
N,N-DIMETHYLACETAMIDE	127-19-5	2,485.26
N,N-DIMETHYLFORMAMIDE	68-12-2	689.28
PYRIDINE	110-86-1	1,764.00
TERT-BUTANOL	75-65-0	603.73
TERT-BUTYL METHYL ETHER	1634-04-4	8,636.10
TETRAHYDROFURAN	109-99-9	12,756.37
TOLUENE	108-88-3	10,283.46
TRIETHYLAMINE	121-44-8	2,668.71
XYLENE	1330-20-7	1,190.70

CONCLUSION

The Air Quality Management System was developed as a continuous compliance tool for Title V and state air quality regulations. AQMS meets the needs to verify permit compliance.

AQMS is used to collect emission information from 10 different research unit areas via either Pfizer's Intranet or specialized Windows program interfaces. AQMS was designed to not only provide the site's EHS group with the required air data but to also provide a value-added system for each research area to streamline their daily business operations for data collection and reporting.

The AQMS system contains specific reports for each business area, including site-wide reports to meet internal corporate reporting needs, as well as state and Title V reporting requirements.

AQMS is a modular system that is comprehensive and easily expandable to meet PGRD-Groton's current and futures needs in the ever-changing regulatory environment.

KEY WORDS

Title V Continuous Compliance, Environmental Data Management