The Expert EMS

At most U.S. shipyards, information is stored in the form of flat files like Excel spreadsheets, word documents, and hard files. Considerable time and money are invested in tracking raw material consumption, maintaining monitoring results, calculating environmental releases, and filing compliance reports. The current system of storing information also makes it difficult to evaluate the performance of environmental systems and trends in environmental releases. This “Expert Environmental Management System (EMS) for Shipyards” manages information on the quantity and quality of materials, in addition to several other related variables, and calculates environmental releases, generates compliance reports, and aids in assessing environmental performance of the facility.

The Expert EMS assists shipyard environmental personnel to:

- Track information and manage data on shipyard processes, materials, products, and wastes.
- Calculate environmental releases using emission factors developed by the EPA and other agencies, or employing the mass balance approach.
- Generate customized reports and compliance reports.

Evaluate performance of environmental systems and assess trends in environmental releases. This feature is useful in developing and implementing environmental management plans due to its decision support capability in selecting cleaner materials, processes, process conditions, and environmental systems.

Software Features

Information is entered, analyzed, and managed through the following software sections:

- Physical details
- Material usage
- Material composition
- Equipment
- Monitoring
- Permit limits
- Releases
- Trends
- Reports
- Help file

This approach is helpful in making navigation easier and reducing the time required by a user to become accustomed to the software.

Physical Details

This software section enables the entry of information for the following physical entities of a facility:

- Facility location and contacts
- Source locations
- Outfall locations
- Ambient monitoring locations
- Stack locations
- Wastewater unit locations
- Waste accumulation areas
Material Composition

Information on the composition of raw material is provided in this section. Reports containing the details of composition of raw material can be printed or stored on the disk. The user can enter, update, and select (from the knowledgebase) composition details for the following materials:
- Paints
- Solvents
- Thinners
- Filler metals
- Fuel

Material Consumption

Material consumption data is entered in this section. Data contains details on process equipment and environmental controls used during the process. Material consumption data can be added or reviewed for changes. Material consumption data on the following shipyard processes can be entered:
- Painting
- Welding
- Cutting
- Solvent degreasing
- Blasting
- External combustion sources

Equipment

Details of controls/process equipment used on the facility are entered in this section. Equipment details such as manufacturer rated efficiency and the source associated with the equipment can also be entered. Information on
combustion units, air pollution control devices, and wastewater treatment units are provided.

**Monitoring**

The user enters monitoring results obtained from the following activities:
- Monitoring ambient air quality
- Monitoring storm water outfalls
- Monitoring process water outfalls
- Monitoring wastewater units
- Tracking solid waste

Monitoring data is used for compliance purposes, tracking wastes, and evaluating the performance of control units.

**Permits**

Compliance is demonstrated by comparing releases for a particular pollutant against its permit limit. Entered in this section are permit limits for air pollutant releases as well as for pollutants discharged through process water and storm water outfalls.

**Releases**

Solid waste and air emissions generated from shipyard processes are quantified in this section. Pollutant quantities from the following processes are calculated using material usage data and engineering methods.
- Painting
- Welding
- Cutting
- Blasting
- Solvent degreasing
- External combustion systems
Trends
The trend in environmental releases over time is displayed using graphics. The user has the option to select the specific facility, pollutant, and duration for analyzing the discharge trend. A graphical display of trends is useful in controlling releases and in taking the appropriate steps to ensure compliance with state and federal regulations.

Compliance Reports
The following compliance reports are generated:

• Annual Hazardous Waste Report (RCRA requirement)
• Annual Air Emissions Inventory (air permit requirement)
• Discharge Monitoring Report (NPDES requirement)
• Hazardous Waste Manifest
• Tier II (emergency response)
• Toxic Release Inventory (Public Right to Know Act)

Anticipated Benefits

• Knowledgebase on emission factors
• Information on recycling, treatment, and disposal options for shipyard wastewater, air emissions, and solid wastes
• Information on the applicable regulations to various shipyard processes
• Information entered only once, thus improving efficiency
• Increased efficiency in preparing environmental reports
• Ability to assess trends in waste releases to make continuous improvements