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Project Summary

Graphical Representations of 1991 Steam-Electric Power Plant Operation and Air Emissions Data

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For over 10 years the U.S. Department of Energy (DOE) Energy Information Administration (EIA) has collected monthly boiler level data from Form EIA-767 (Steam-Electric Plant Operation and Design Report). The U.S. Environmental Protection Agency (EPA) has contributed funding to DOE for this effort. The full report presents summary data from the 1991 EIA-767 database for public information. The report summarizes information from the EIA-767 database that is otherwise not readily available to the community of electric utility data users or other members of the general public. To facilitate ease of interpretation by nontechnical readers, the report emphasizes graphical displays of data, including 98 charts and 3 tables. The graphics present national data, national coal data, regional data, specified state data, and specified operating utility company data. Data tables show sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emissions by state, and the highest emitting electric utility companies. Charts show SO_2 and NO_x emissions by fuel type, fuel type and sulfur content, and fuel type and boiler capacity. Charts also present data on boiler utilization, and heat input by fuel type and sulfur content. Additional charts for coal display coal quantities by sulfur content, quantities of scrubbed and not scrubbed coal, and boiler capacity and utilization.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

In 1980, the electric utility industry in the U.S. accounted for 67% of all U.S. emissions of sulfur dioxide (SO_2) and 30% of emissions of oxides of nitrogen (NO_x). As a result of Title IV (Acid Rain/Deposition) of the 1990 Clean Air Act Amendments (CAAAs), electric utilities will be expected to account for 8.7 million tons (87%) of the SO_2 emission reductions and 2 million tons (100%) of the NO_x emission reductions by the year 2010. Thus, there is heightened interest in electric utility data that are currently available for review and analysis.

For over 10 years the U.S. Department of Energy (DOE) Energy Information Administration (EIA) has collected monthly boiler level data from the Form EIA-767 (Steam-Electric Plant Operation and Design Report). The U.S. Environmental Protection Agency (EPA) has contributed funding to DOE for this effort. Data from EIA-767 are available through 1991. Typically, these data have been used by EPA in the past for purposes such as development of the National Utility Reference File for the National Acid Precipitation Assessment Program, annual production of ***National Air Pollutant Emission Estimates*** reports, and development of an interim 1990 national emissions database to support regional oxidant modeling activities. The data have also been used in the development of the National Allowance Database to support new acid deposition regulatory requirements of Title IV of the CAAAs.

The full report summarizes data from the most recent EIA-767 database for public information. The report analyzes and summarizes information from the EIA-767 database that is otherwise not readily available to the community of electric utility data users or other members of the general public. To facilitate ease of use and interpretation by nontechnical readers, the report emphasizes graphical displays of data.

Methods

All electric utility companies with plants that have at least one operating fossil-fuel steam boiler of at least 10 MW are required to provide information to EIA on EIA-767, although the amount of data required from plants with less than 100 MW of steam-electric generating capacity is much less. EIA-767 is a multipage form that includes plant, boiler, generator, air pollution control system, and stack level data. For plants with nameplate ratings of at least 10 to less than 100 MW, only selected pages of the EIA-767 must be completed. (Stack and flue information is not required for these smaller plants.)

The data reported on EIA-767 are compiled into an electronic form. The master database is available on EPA's mainframe IBM computer using customized software written in the Statistical Analysis System (SAS) software package. To complete the graphics for this report, the EIA-767 data were converted into a database form. Each "page" format is reproduced on the computer file exactly as it appears on the written page of the form. The data from each page must be extracted from the computer file, associated with the correct boiler, and combined with all corresponding data from the other pages for that boiler. Calculated fields are added to the database to store values such as emissions, which are not present on the EIA-767 pages. Emissions calculations rely upon ***Compilation of Air Pollutant Emission Factors (AP-42***) emission factors together with EIA-767 data for fuel amounts burned, fuel sulfur contents, fuel heat input values, and control device efficiencies to estimate emissions.

Separate data files that include only the database records and data elements necessary to produce graphics were created and downloaded from the mainframe to the PC. These files were input into Microsoft Excel, a personal computer software package with spreadsheet and graphics capabilities. The figures of the report were produced using standard Excel charting capabilities.

Results

There are 98 charts and 3 tables presented in the report to describe the 1991 EIA-767 data. Different chart types are used both to better describe the data and to vary the presentation. The graphics were produced and grouped to represent national data, national coal data, regional data, specified state data, and specified operating utility company data. Data presented in tables include state SO_2 and NO_x emissions by state, and the highest emitting electric utility companies. Data presented in the charts include SO_2 and NO_x emissions by fuel type, fuel type and sulfur content, and fuel type and boiler capacity. Charts also present data on boiler utilization and heat input by fuel type and sulfur content. Additional charts are shown for coal, which display coal quantities by sulfur content, quantities of scrubbed and not scrubbed coal, and boiler capacity and utilization.

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The complete report, entitled "Graphical Representations of 1991 Steam-Electric Power Plant Operation and Air Emissions Data," (Order No. PB95-136156; Cost: $27.00, subject to change) will be available only from
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