THE PRINCETON BOILER PLANT ELECTRONIC LOGBOOK PROJECT

Scott L. Englander and Cathy L. Reynolds Center for Energy and Environmental Studies, Princeton University, and Jeff S. Haberl, Texas A&M University

The Boiler Plant Logbook, a microcomputer application combining a graphical user interface with a database management system, provides data entry, error checking, data analysis, report generation, and data browsing capabilities, thus saving valuable operator time. The system is designed to be easy for someone with no previous computer experience to learn and use.

Prior to implementation of the Logbook, operators of the campus boiler plant at Princeton recorded measurements and meter readings on large (20 in. by 30 in.) sheets of paper, a procedure that made performance analysis time-consuming (and therefore performed only on a monthly basis). This limited and infrequent feedback constrained the degree to which analysis could improve operation of the plant. Using the electronic Logbook, the plant manager enters daily measurements. Icon buttons and pull-down menus, accessed using a mouse, enable the user to navigate through the Logbook (illustrated by the accompanying figures). The user can obtain immediate feedback on plant performance and efficiency via graphs and summary reports, as well as access to historical data.

The Logbook is designed to help plant operators improve the efficiency of the boiler plant through improved use of manual measurements. Future implementations would make direct use of automatic measurements. Still under development at the time of this writing, the Logbook is not yet implemented at the campus boiler plant, but has been successfully demonstrated to facilities managers.



Figure 1. The Logbook as it Appears Just After Launching, ready for the user to initiate some action using either the pull-down menus at the top of the screen, the tabs at the bottom of the notebook, or the icon buttons at the right, by clicking on them with a mouse.



Figure 2. Some of the Menu Commands and their Keyboard Shortcuts. The menu commands are used to navigate throughout a given section of the Logbook, add new pages, perform calculations, etc. All commands are not available in all sections of the Logbook; unavailable commands appear in "fuzzy" text. A command ending in "..." brings up a dialog box requiring the user to make further choices or specifications. For example, after selecting "Calculate...," the user can choose to perform calculations on the current day's data, the next n days, the whole logbook, or a specified period.

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Figure 3. First Page of the Daily Input Section of the Logbook. Plant operators enter readings taken at the end of the day. Once all of the data for a given day are entered, the user may proceed to perform calculations...

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Figure 4. First Page of the Daily Calculations Section of the Logbook. Consumption and efficiency are calculated for the plant as a whole (with and without steam losses), and for each individual boiler (not as accurate, due to the meters used). Additional pages not shown are for additional daily inputs and calculations, monthly and annual inputs and calculations (including data from utility bills). There is also a Notes section to log notes for a given day, and a Constants section, for entering meter multipliers and other constants and their applicable time periods.



Figure 5. Sample Graphs Produced by the Logbook. Such graphs might appear in a monthly report, or might be called up by an operator wishing to explore the performance of the plant.