Process Control Case Study: Fired Heater

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Short examples of many process control designs are presented in the solved examples in the book. In this appendix, the control of a fired heater is considered *in detail*. A fired heater is chosen because it is one of the most important unit operations in the chemical industry. Also, fired heaters provide excellent learning experiences for nonlinear, multivariable processes with significant interactions. The exercises in this appendix can be completed without the aid of a simulator. However, complementary simulation exercises will substantially enhance the learning experience.*

This appendix enables readers to apply their process and control skills to the control of a fired heater by performing a series of exercises of increasing complexity. Many of the exercises involve open-ended questions to give you experience in defining and solving realistic problems. Since successful process control relies on knowledge from process technology and instrumentation, readers are encouraged to utilize their library, Internet, and self-study skills to investigate issues raised in these exercises. The references at the end of this appendix provide good initial sources of information and an introduction to the literature on fired heaters and their control.

The exercises in this appendix cover the topics in the same order as in the body of the book. To assist the readers, the exercises are organized according to the six

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* A menu-driven, fired heater simulation is available in the Software Laboratory, Version 3.0 (Marlin, 1999), which runs within the MATLAB™ language (Mathworks, 1998). In addition, commercial flowsheeting programs have the capability to simulate process dynamics using standard models and rigorous physical properties; examples are Aspen Dynamics™ (Aspen, 1999) and HYSIS (Hyprotech, 1998).