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FROM: Warren D. Seider and Leonard A. Fabiano

DATE: August 23, 2002

SUBJ: ChE 459, Plant Design Project

This is our annual invitation to participate in ChE 459. We are beginning to assemble a set of design problems and would welcome problems that are timely, challenging, and have the *strong likelihood that their final designs will be economically attractive.* In this regard, student motivation and faculty enthusiasm are closely related to the feasibility and potential impact of the final designs. When suggesting problems, please try to assure that they are workable by undergraduate seniors without unduly gross assumptions. To the extent possible, good sources of data should be available for the reaction kinetics and thermophysical and transport properties. Please jot down a few references; preferably providing an overview of the processing problem and sources of data.

In ChE 400, our students are learning to apply the principles of process synthesis; i.e., to synthesize reaction paths, separation trains, networks of heat exchangers, etc. They are also being taught to use the ASPEN PLUS simulator (Version 11.1), and are being introduced to related software in the Aspen Engineering Suite; e.g., SPLIT, HETRAN, IPE, ASPEN DYNAMICS, and BATCH PLUS. In addition, they are learning to use Holger Nickisch's spreadsheet for profitability analysis and are being introduced to SUPERPRO DESIGNER. This year, we will continue to introduce examples that involve the synthesis of batch processes for the manufacture of specialty chemicals and pharmaceuticals. Additional emphasis will be placed on the design of *products* (e.g., dialysis devices, solar desalinators, wafers involving chemical vapor deposition of silicon, pharmaceuticals), as well as processes.

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The best problems would enable the students to apply the principles of process synthesis while designing timely processes that are of current interest in the CPI and related industries. While most problems are stated to create new processing possibilities, different from processes designed by previous design groups, it can also be desirable to repose a design problem to enable a new design group to extend the work of a previous group, to examine other alternatives, to prepare a more complete design, etc. If you can provide, or help us identify sources of, design problems on the manufacture of specialty chemicals, pharmaceuticals, and electronic materials, these would be especially welcome.

We would appreciate receiving your suggestions by **Friday, October 4**. If possible, please send us your problem statements in an electronic format, either on diskette or by e-mail, preferably as an attached WORD file. We use Microsoft WORD for WINDOWS 2000 or for Macintosh; most text files can be translated from either platform. If you have figures, please send us a scanned or printed copy. We'll scan the figures, if necessary.

With your help, we are hopeful that we will be able to assign design projects by mid-October. We will encourage each design group to meet once with the contributor of its problem statement during the Fall Semester. While the bulk of the work will be carried out during the Spring Semester, the students should be more motivated to study the topics covered in ChE 400, our fall lecture course.

This year, we will have seven design groups. For those of you who contribute problems regularly, about the same number as last year would be very helpful.

Whether or not you are able to provide one or more problems, we are very hopeful that you will plan to visit on alternate Tuesday afternoons in the Spring. If you can provide a problem, but are not available to visit regularly, your participation is welcome.

We would like to draw your attention to the web site for our design courses, www.seas.upenn.edu/~seider/design.html. At this site, you will find the list of industrial consultants (with contact information), last year's design problem statements, the design groups and the schedule for their meetings last Spring, and many related items.

We continue to use our textbook, *Process Design Principles: Synthesis, Analysis, and Evaluation* (Seider, Seader, and Lewin), published by John Wiley. It is packaged with our multi-media CD-ROM, *Using Process Simulators in Chemical Engineering: A Multimedia Guide for the Core Curriculum*. Information about this courseware can be accessed from the web site for our design courses. Note that Appendix VIII contains 31 design problem statements (taken from our report, *Process Design Projects at Penn: 100 Problem Statements,* which is out-of-print). Finally, bound copies of our design reports are available in the Towne Library. Many have been borrowed by faculty members using Interlibrary Loans.

Thanks and best regards. Our course has been very successful largely due to the excellent problems you suggest and your advice during the Spring semester. Our faculty very much appreciates the important interaction you provide for our students and ourselves.

cc: ChE Faculty