

# Robert S. Kline, P.E.

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## Education

### Cornell University, Ithaca NY

- M.Eng in Chemical Engineering, May, 1996
- BS in Chemical Engineering, May 1995

## Work Experience

### Eastman Chemical Company, Project and Process Engineering, Kingsport, TN

(7/96 – present)

#### Process Engineering

(5/02 –present)

- Considered one of company's process modeling experts. Modeled and validated a variety of batch and continuous processes including bulk industrial chemicals, fine chemicals, solids, and coal.
- Developed and validated Aspen model of existing plant solvent recovery system. Analysis of the model results using residue curve maps led to a 15% capacity increase and \$3 MM per year cost reduction with no significant capital expenses.
- Performed process and reactor optimization of an existing chemical production facility. Changes in operating conditions led a \$1.5 MM per year reduction of costs due to increased process yield.
- Front end engineering lead for a \$15MM retrofit project coordinating design work of in-house engineering, site operating representation, and contract engineering.
- Mentored new employees with long term interests in process modeling. Taught seminars on process simulation, flammability, and financial analysis to new and experienced engineers.

#### Acetyls Technology Licensing

(8/02 –5/05)

- Led licensing R&D study to optimize alternate process configurations for an acetic acid/acetic anhydride coproduction plant. Patent pending on novel reaction scheme.
- Lead process engineer for licensing effort and Front End Engineering Package. Responsible for a \$3MM engineering budget for a team of 93 engineering, technicians, and technologists from 3 companies at three geographic locations. Responsible for review and approval of all engineering deliverables.
- Additional responsibilities included heat and material balance development, design and development of purchase grade equipment specifications for heat exchangers and a reactor, P&ID review and development, and participation in safety system design and HAZOP review.
- Provided primary contact point with customer for technical questions and review during the project.
- Provided on site and remote support during the technology transfer phase.

#### Catalysis Research Laboratory

(4/01 –5/02)

- Developed and validated process models for pilot plant facilities.
- Measured kinetic and phase equilibria data in the laboratory and regressed parameters. Developed reactor models to utilize the data and analyze plant operation.
- Performed preliminary process development and economic evaluation for proposed processes to compare with existing technologies and direct research funding.

- Process Engineering (7/96 –4/01)
- Process design lead for a \$60 MM production plant involving more than 50 engineers responsible for Heat and Material Balances and developing design basis for equipment design.
  - Evaluated economic feasibility and optimized new and existing processes.
  - Lead joint application effort for a DOE cooperative agreement with Eastman and Air Products.
- Fine Chemical Process Design and Development (8/97 – 10/00)
- Developed processes for new products using residue curve map analysis and process simulation for batch and continuous processes.
  - Performed process debottlenecking and batch optimization studies.
  - Worked with chemists and research engineers to identify process unknowns and develop an experimental plan.
  - Novel recovery scheme led to US patent 6,444,096.
- Epoxybutene Special Projects Team (10/97 – 6/00)
- Worked on cross functional team with research chemists and engineers, operations engineers, and representatives from business organizations to reduce the capital cost of a 100 MMlb/yr facility by 35%.
  - Process synthesis and design work led to several patents.
  - Modeled gas phase oxidation reactor including kinetics, intraparticle diffusion, and axial and radial heat transfer effects.
  - Developed catalyst activity and selectivity targets to direct catalyst formulation experimental program.

**DuPont Merck Co., Radiopharmaceutical Division, Billerica MA (12/91 – 8/95)**

- Summer and winter internships in Research, Development, Engineering, and Production at a Radiopharmaceutical facility.
- Performed Installation, Operation, and Performance cGMP Validation for a manufacturing upgrade.
- Developed operating procedures and validated PLC programs for pharmaceutical manufacturing process.

**Computer Skills**

**Modeling and Design Tools:** Aspen Engineering Suite, Excel, HTRI, Icarus IPE, PI Process Book.

**Languages & Software Technologies:** Visual Basic, Visual C++, C#, FORTRAN, .NET, COM, ADO, MFC.

**General Computing Skills:** Word, Excel, Access, Powerpoint.

**Publications and Organizations**

**US Patents:**

- 6,018,061, "Process for recovering 3,4-epoxy-1-butene"
- 6,270,739, "Process for removal of carbon dioxide from 3,4-epoxy-1-butene recycle streams"
- 6,395,913, "Recovery and purification of 3,4-epoxy-1-butene"
- 6,444,096, "Process for the recovery and purification of cyclobutanone"
- 6,500,970, "Recovery and purification of 3,4-epoxy-1-butene using high-boiling solvents"
- 6,582,565, "Recovery of 3,4-epoxy-1-butene by extractive distillation"
- 6,596,882, "Recovery and purification of 3,4-epoxy-1-butene using water-miscible solvents"
- Pending, "Production of Acetic Acid and Mixtures of Acetic Acid and Acetic Anhydride"

**Publications:**

R. Ervin, M. Palucis, T. Glowienka, V. Van Brunt, W. Chastain, R. Kline and P. Lodal "Using the Adiabatic Flame Temperature to Predict the Flammability of Lower Alkanes, Carboxylic Acid and Acetates" – Presented at the Spring 2005 AIChE Conference

M. Palucis, T. Glowienka, R. Ervin, V. Van Brunt, W. Chastain, R. Kline and P. Lodal, (2006) "Prediction of Flammability Speciation for the Lower Alkanes, Carboxylic Acids, and Esters", *Process Safety Progress* **26**, pp.4-10.

**Licenses & Organizations:** State of Tennessee Professional Engineer Lic# 00107751, AIChE Local Chapter.