



Operating Plant and Systems Professionals

Inc. 'Your Increased Profitability is Our Bottom Line'

DAVID A. SMITH, PE
INNOVATOR IN PROCESS ENGINEERING,
PATENT HOLDER, DESIGN MANAGER/ FIELD ENGINEER/
PROJECT ENGINEER CHEMICAL ENGINEER

CAREER PROFILE

Solidly experienced in power-carbon sequestration, chemical, pharmaceutical, food, refinery and allied process industries. Developer of processes from conceptual through detailed design with specifications and cost estimating. Develops constructible systems from ideas.

SPECIAL FIELDS OF KNOWLEDGE

- Power Plant Environmental Systems
- Bulk handling
- Pharma Secondary manufacturing
- Good manufacturing practices and validation
- Distillation
- Pure water systems
- Fermentation kill systems/containment
- Spray drying
- Clean In Place/Steam In Place
- Energy systems for carbon capture
- Hazardous waste

EXPERIENCE

FIT, Inc. San Antonio, TX 2011 to Present
Senior Process Design Consultant
David assists FIT clients with process design, improvements, start-ups, etc.

DAVID A SMITH PROFESSIONAL ENGINEER, LLC Lawrenceville, NJ 2005 to Present
Principal: Expert witness on a chemical plant that exploded. CO2 capture for Underwater Breathing Apparatus research. Various applications for research into the design of CO2 capture and use systems.

CARBOZYME, Inc. Monmouth Junction, NJ 2003 to 2009
Sr. Process Engineer: Research of systems for extracting and concentrating CO₂ from respiration of astronauts and stack gases of power plants. Developed PFD's, Heat and Material Balances, Cost and energy usage estimates, and experimental system designs and implementations of Power Plants up to 800 MW. Extensive comparisons with real and purported operations of competing carbon capture systems for Coal and Natural Gas fired power plants.

MUSTANG TAMPA – Philadelphia Operations Pennsylvania 2002 to 2006
Principal Process Engineer: Utilities (steam, condensate, BFW and cooling water) upgrade for a 420 M barrels per day refinery to make ultra low sulfur diesel in UAE, conceptual design of \$80MM flavor and fragrance solids manufacturing facility. Trouble shooting refrigeration system for large lyophilization operation. Engineering an innovative vanilla bean extraction process in an extraction plant. Developed production improvements for operations and product quality of a small Pharmaceutical Company. Designed a distribution system for CIP sol'n in a sterile suite and a series of pilot plant centrifuges for Merck. Provided field engineering at a plastics plant in Decatur, AL. All activities include innovation in process and operations. Constructed value \$1MM to over \$1B.

BURNS and ROE ENTERPRISES, Inc Mt. Laurel, New Jersey 2001 to 2002
Chief Process Engineer: Managed a staff of up to 7 engineers. Provided design management for a Pharmaceutical sponge project. Projects included a fragrance pilot plant, hemostat mfg. and flu gas desulphurization.

WASHINGTON GROUP INTERNATIONAL (Raytheon E&C) Philadelphia, PA 1993 to 2001
Senior Process Technologist: Conceptual and detailed Process Design. Provided Project Engineering on several small projects. These include bulk pharmaceutical plants; sterile filling facilities, blood plasma production, fragrance production and hazardous solids control facilities. The unit operations include CIP, vacuum distillation, batch & continuous reactions, filtration, gas distribution systems, tableting, vial filling, packaging, pasteurizing, lyophilizer systems, microencapsulation, micronization, mammalian fermentation and solids handling. Clients included Pharmacia & Upjohn, Merck, Hoffman LaRoche, Takasago, FMC, Ortho and Bayer. Project constructed value up to \$350MM

THE SIGEL GROUP Narberth, PA 1992 to 1993
Principal Process Engineer: Brought process knowledge to the piping department of a company with strong mechanical, electrical and architectural ability. Assisted young engineers in developing their process skills and managing their design. Projects included liquid nitrogen handling safety systems for Merck, tablet facility and a computerized utility reference system with master plan for Glaxo.

SVERDRUP CORPORATION Princeton, NJ 1990 to 1992
Director of Process Engineering: Management of nine member department, conceptual studies, design management and project management. Projects included wastewater diversion tank with pipe rack, pure water systems, sterile filling, CO₂ absorption system, tableting facilities, gelatin, food packaging and pharmaceutical bulk manufacturing. Clients include Dow, Miles, Schering, and Syntex.

H-R INTERNATIONAL, INC. Edison, NJ 1988 to 1990
Manager of Process Engineering: Administration of 9 process engineers, design management and process engineering.
Process Manager: Managed the design activities for a team of process engineers. Project experience included: \$30MM electronics grade fluoropolymer plant expansion for ICI. Development of pure manufacturing guidelines for Hoffman LaRoche to upgrade their APCs to insure that they meet the FDA's cGMP for nonsterile product. Designed a USDA burrito production plant. Improvement of waste handling in a battery lead recycling plant.

JACOBS ENGINEERING GROUP, INC. Mountainside, NJ 1981 to 1988
Principal Process/Project Engineer: Project and process engineering for pharmaceutical, food, fine and heavy chemicals, metal and catalyst plants. Projects included production facilities for sterile antibiotic powder; specialty narcotics; polypeptides; methanol reformer heat recovery; precious metal recovery; catalysts; lollipops; stereo isomer alkaloids; interferon; yeast by continuous fermentation; mammalian cell; petrochemical UDEX column; hazardous waste transfer station and water treatment plant. Designed 2 USP purified/WFI systems with 7000 feet of pipe which started up and was validated seamlessly. System has produced water quality better than design from start up without deviation.

METEX PROCESS EQUIPMENT CORPORATION Edison, NJ 1978 to 1981
Senior Project Engineer/Field Engineer: Handled sales, testing, design, construction, start up and trouble shooting for process distillation equipment. Products included distillation, extraction and scrubber columns with proprietary packing and mist eliminators.

FIRMENICH, INC. Princeton, NJ 1974 to 1978
Plant Engineer: Managed projects from inception through start up of wastewater treatment facilities, odor incinerator, fuel oil alternate system, spray dryer improvements; and provided engineering support for food flavor manufacturing.

MERCK AND COMPANY, INC. Rahway, NJ 1970 to 1974
Assistant Department Head: Provided technical assistance and administration of unionized processing unit of narcotics factory.
Chemical and Food Engineering: Vitamin product development, sales and processing.

E.I. DuPONT DE NEMOURS & COMPANY, INC. Wilmington, DE 1969 to 1970
Research Engineer: Sales and development work on direct contact fluorocarbon food freezers.

EDUCATION

M.S., food engineering, Massachusetts Institute of Technology, Cambridge, MA
B.S., Chemical Engineering, University of California, Berkeley, Berkeley, CA

REGISTRATION

Professional Engineer, Chemical Engineering Licensed in New Jersey and Massachusetts
Past Record holder with National Council of Examiners for Engineering and Surveying

ORGANIZATIONS

American Institute of Chemical Engineers
Member ASME Carbon Sequestration Committee

PUBLICATIONS

Trachtenberg M.C., Bao L., Smith D.A., Goldman S.L., Wu X. (2005) Enzymatically Driven, Cost-Efficient, Capture of Flue Gas CO₂ 4th Annual Carbon Capture and Sequestration Symposium, Alexandria, VA., May

Trachtenberg M.C., Bao L., Goldman S.L., Smith D.A., (2004) Flue Gas CO₂ Capture by a Green Liquid Membrane. GHGT-7, Vancouver, BC, September

Goldberg, E., D. Smith & F. Tienken (1986) Solvent Dehydration by Solid Drying Agents (Part I). Pharmaceutical Engineering 6(4):24-26.

Goldberg, E., D. Smith & F. Tienken (1986) Solvent Dehydration by Solid Drying Agents (Part II). Pharmaceutical Engineering 6(5):36-37.

PATENTS

Smith, D.A., Cowan, R.M., Trachtenberg, M.C. Temperature controlled Gas-Liquid-Gas Permeator. 2008. U.S. Provisional Pat.. App. No. 61/021021.

Smith, D.A. Valve assembly. 2005. U.S. Pat. No. 6,883,777.

PRESENTATIONS

- Pure Water II seminar of the ISPE, Philadelphia May 1992
- Containment Issues seminar at PharmTech Puerto Rico, June 2000
- P&ID Development Instructor & student project evaluator - Rutgers University, April 2002 & May 2003.

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B.S., Chemical Engineering, University of California, Berkeley, Berkeley, CA

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