

**THE PROCESS GROUP**  
*A Limited Liability Company*

**ED AITKEN**

Principal

**THE PROCESS GROUP, LLC**

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**SKILLS:** Over 26 years experience in refinery operations, design and research, with specialization in LP modeling and in FCC design, operation, and catalysts.

**EDUCATION:** B.S. Chemical Engineering, Oregon State University, 1980  
M.S. Chemical Engineering, University of Massachusetts, Amherst, 1983

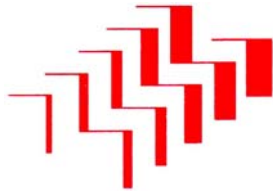
**EMPLOYMENT HISTORY:**

1996 to Present	The Process Group, LLC
1988-1996	Fluor
1983-1988	Unocal

**EXPERIENCE:**

Process engineering experience:

- Gas phase caustic treating package for ConocoPhillips in Wood River, IL (2009)
- Development of shale oil upgrading plant Process Design Basis for QER in Queensland, Australia (2009)
- Safe Operating Limits (SOLs) for ConocoPhillips in Los Angeles, CA (2008-2009)
- FCC fractionation debottleneck study for ConocoPhillips in Billings, MO (2008)
- Crude, vacuum and delayed coker unit debottlenecking study for Tesoro in Wilmington, CA (2007-2008)
- Improve recovery of refinery LPG for Tesoro in Wilmington, CA (2007-2008)
- FCC unit revamp for ConocoPhillips in Wilmington, CA (2006-2008)
- Coker Revamp Study for ConocoPhillips in Sweeny, TX (2006)
- Developed relief valve data for crude unit for ConocoPhillips in Carson, CA (2006)
- Crude Unit revamp study for ConocoPhillips in Carson, CA (2005)
- Coker Main Fractionator troubleshooting study for ConocoPhillips in Carson, CA (2005)
- Strategic planning studies for refinery expansion for ConocoPhillips in Wilmington and Carson, CA (2004-2006)
- Developed relief valve data for multiple hydroprocessing units for ConocoPhillips in Wilmington, CA (1996-2006)
- Fluid catalytic cracker revamp for ConocoPhillips in Wood River, IL – FEL-1 package



(2004-2005)

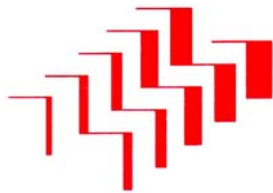
- Prepared baseline documentation for utility systems for ConocoPhillips in Wilmington and Carson, CA (2005)
- Ultra Low Sulfur Diesel feed package for ConocoPhillips in Wilmington, CA (2003-2005)
- Midbarrel blending feed package for ConocoPhillips in Wilmington, CA (2003-2005)
- Hydrocracker gas plant revamp study (2002)
- Develop Benzene Neshaps engineering options (2002)
- Alkylation Unit Startup (2002)
- Ethanol blending studies for Tosco LA refinery (2001)
- Ultra low sulfur diesel studies for Tosco LA refinery (2000-2001)
- MTBE Phaseout and low sulfur gasoline studies for Tosco LA refinery (1999)
- MTBE Phaseout studies for Ultramar LA refinery (1998-1999)
- Prepared and presented a Crude/Vacuum Unit operator training program for ARCO in Carson, CA (1998)
- Refinery configuration studies for Tosco Rodeo/Avon refineries (1997-1998)
- Refinery configuration studies for Abu Dhabi National Oil Company (1995-1996)
- LP modeling specialist for Fluor Daniel (1992-1996)
- Reformulated fuels specialist for Fluor Daniel (1992-1996)
- Developed scope for meeting the EPA and CARB regulations for gasoline and diesel fuels for Unocal's refineries in Wilmington and Carson, CA (1992-1995)
- FCC feed hydrotreater project for Unocal in Wilmington, CA (1991)
- Refinery modernization program for Chevron in Richmond, CA (1990)
- Bottoms up-grading study for FINA in Antwerpen, Belgium (1989)
- Flare study as part of sulfur removal project at Texaco in Wilmington, CA (1988)

Operations process engineering experience:

- Optimized FCC gas plant light ends recovery
- Improved FCC gasoline octane and light ends production using ZSM-5 catalyst additive
- Developed FCC yields and property prediction based on feedstock quality
- Revamp of crude and light ends recovery operations
- Developed FCC gas plant model using Profimatics software

Research engineering experience:

- FCC catalyst development and testing
- Hydroprocessing catalyst and process improvements
- Advisor for catalyst selection and improvements



**PUBLICATIONS:**

- "Retooling the Refinery for Reformulated Gasoline - - Meeting Complex Model, CARB, and EPA Phase II Regulations", with M. Bodziak, M. Page, and A.R. Smith, 1995 Refining Process Services, Inc. seminar in Houston.
- "Engineering California RFG Projects," with M. Page, A.R. Smith, and J.S. Land, presented at the 1995 NPRA Annual Meeting in San Francisco.
- "The Impact of EPA and CARB Reformulated Gasoline Regulations on Refinery Operations", with M. Page, 1994 SCMA/ISA Short Course in Long Beach, CA
- "SOx Control in FCC", with Z.C. Mester and P. Ritz, 1987 ACS National Meeting in New Orleans, LA
- "Advantages and Flexibilities of FCC Feed Pretreating", with R. Miller and M. Skripek, 1987 Katalistiks FCC Symposium in Budapest, Hungary
- "Controlling FCC Regenerator Emissions", with K. Baron and Z.C. Mester, 1985 Katalistiks FCC Symposium in Munich, Germany
- "Morphological Changes Due to Carbonization on a Nickel Catalyst", with W.C. Conner and V. Hansel, The Eighth North American Meeting of the Catalyst Society
- "Determination of Catalyst Morphology Using a Pore/Throat Network Model", with A.M. Lane, W.C. Conner, and K.M. Ng, The Eighth North American Meeting of the Catalyst Society
- "Electron Spectroscopic Investigations of the Influence of Initial and Final State Effects on Electronegativity", with M.K. Bahl, K.D. Bomden, J.K. Gimzewski, G.S. Nolan, and T.D. Thomas, JACS 1980, 102, 4873

**PATENTS:**

- "Sorbent for Reducing Sulfur Oxide Emissions from Catalytic Cracking and Process for Producing the Sorbent", U.S. 4,686,204
- "Process for Reducing Sulfur Oxide Emissions from Catalytic Cracking Units", U.S. 4,642,177