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Consulting Services

Providing expert consulting services to refining industry in the areas of hydroprocessing, reforming/isom and clean fuels technologies.

Job Experience

Had extensive commercial experience and in-depth knowledge in many refining technologies with strong R&D background.

PetroTech Consultants 4/2000-present

- Principal of consulting firm specializing in petroleum refining technology
- Provided expert advices to several refiners in US, Europe and S. America on selection of clean fuel technology, development of low cost revamp projects, process yield improvements, and improved reliability and profitability of refining assets
- Provided ULSD design package (including reactor design) to a German refiner, which was successfully implemented in 2002. Two units have been producing ULSD (<10ppm sulfur) since January 2003.
- Co-authored 7 papers presented in AIChE & NPRA Meetings in 2001-04, including the following 5 papers published in technical journals:
 - *Oil & Gas J. Sept. 10, 2001, p. 68, and June 2, 2003, p. 52*
 - *Petroleum Technology Quarterly, Winter 2001/02, p. 35*
 - *World Refining, October 2002, p. 30*
 - *Oil & Gas J. Aug. 8, 2005 (to be published)*

Mobil and ExxonMobil 12/1979-3/2000

- From 12/99-3/00, was selected to the ExxonMobil Technology Synergy Team to transfer Mobil's Hydroprocessing technologies to Exxon's refineries and vice versa
- From 1/97-7/99, was selected and sent to BP Technical Center (UK) to provide technical support to BP-Mobil JV refineries. Involved in refinery asset supporting and implementation of clean fuels strategy in several refineries
- From 1/90-11/99 (excl 2.5 years at BP), provided technical support to Mobil's hydroprocessing units worldwide. Played a key role in improving hydroprocessing assets via low cost upgrading projects
- Major accomplishments during 1990-1999 are listed in the attachment
- From 1979-1989, involved in many R&D activities in the areas of hydroprocessing, reforming, lube processing and thermal processing. Major accomplishments include the development of a Catalytic Reformer Model and the successful commercialization of Mobil's Methanol-to-Gasoline process

Occidental Petroleum Research Corp. 1977-1979

- Conducted R&D on coal and shale oil conversion to liquid fuels

Union Carbide 1975-1977

- Conducted R&D on syngas conversion and wastewater treatment

Education

1975 Ph. D. Chemical Engineering, University of Houston, Texas

1972 M. S. Chemical Engineering, University of Houston, Texas

1969 B. S. Chemical Engineering, Cheng Kung University, Taiwan

Other Accomplishments (1990-1999)

Part I (1/1997-7/1999): Provided Technical Support to BP-Mobil JV refineries in Europe.

BayernOil (Germany)

- Diesel hydrotreater upgrading– recommended low cost options to improve the capability and performance of 3 diesel hydrotreaters
- Clean fuels review – recommended low cost options to produce <50 ppm sulfur mogas and diesel, saving significant capital cost
- Provided technical inputs for manufacturing <10 ppm sulfur mogas and diesel in 2003.

Lavera Refinery (France)

- Hydrocracker improvements- recommended replacing reactor internals and catalyst to improve yields and cycle length
- Clean fuels review - involved in the review of clean fuels strategy. Recommended options to increase low sulfur diesel production

Gravenchon Refinery (France)

- Clean fuels strategy – recommended options for benzene reduction in mogas and options to increase 50 ppm sulfur diesel capability
- Refinery operations support – recommended catalyst replacement in Reformer to increase yield and cycle length. Involved in process improvements for HDP units

Mersin Refinery (Turkey)

- Optimized Diesel HDS unit operations and catalyst selection
- Recommended low cost debottleneck options to upgrade HDS unit

Other Activities

- Yields Enhancement Study (YES) – led the HDP Team in Grangemouth Refinery (Scotland) YES and identified major improvement opportunities
- Best Practices and Networking – involved in both Mobil and BP's networks for sharing best practices in HDP and Reforming / Isom

Part II (1995-1996): Provided technical support to Mobil's Asia Pacific refineries and MAK licensing effort.

Jurong Refinery (Singapore)

- Played a key role in the Mild Hydrocracker (MPHC) catalyst selection and start-up, achieving more than \$3 m per year incremental uplift
- Played a key role in the design and start-up of a grassroots Diesel Hydrotreater and in the improvements of many HDP units

KPI Chiba Refinery (Japan)

- Involved in MPHC catalyst selection and unit optimization. Recommended low cost options to increase unit throughput and profitability
- Played a key role in the design and successful start-up of a grassroots Diesel Hydrotreater to increase 50 ppm sulfur diesel capability

Mobil Australia (Altona Refinery and Adelaide Refinery)

- Advised catalyst selection, start-up and unit trouble-shooting

MAK Licensing Support

- Contributed significantly to the successful first MAK licensing to OMV (Austria) Mild Hydrocracker (which is also a Cat Feed HDT)

Part III (1990-1994): Implemented Mobil's Highly Successful Low Sulfur Diesel Strategy in 1993.

500 ppm Sulfur Diesel Strategy

- Carried out a comprehensive pilot plant testing program to develop Mobil's low cost strategy to meet sulfur specs in both US and EU
- Implemented the highly successful production strategy that make Mobil a lot of money during the early days of low sulfur diesel

Californian (CARB) Diesel Strategy

- Successfully developed two alternate CARB diesel formulations (with 23% aromatics) that meet CARB legal diesel emission specs
- Co-invented and implemented low cost process to produce CARB legal diesel (<10% aromatics) for use in alternate CARB diesel blend, thereby increasing total CARB diesel production and thus profitability

Part IV (1979-1989): Involved in many R&D activities in the areas of cat reforming, synfuels, lube processing and thermal processing.

Major accomplishments include

- Development of a Catalytic Reformer model
- Development of a Lube Quality Predictive model
- Successful commercialization of Mobil's Methanol-to-Gasoline process