

Client: **Freeport McMoran Oil & Gas**, Inglewood, CA
Trouble Shooting to resolve numerous issues and reconfigure expander plant to operate reliably.

Client: **Chevron Oronite Co**, Belle Chase, LA
Trouble Shooting to resolve SRU sooting issues.

Client: **ExxonMobil** - Torrance Refinery, CA
Participant as process expert in sulfur pit vent gas disposal project team.

Client: **Flint Hills Resources** - Pine Bend Refinery, MN
Console Specific operator training SRU Furnace, Tail Gas unit, Amine Contactor and Regenerator.

Client: **Chevron** - El Segundo refinery, CA
SRU reliability and expansion study.

Client: **Plains Exploration & Production**, Inglewood Gas Plant, CA
Gas Plant Operator Training.

Client: **ExxonMobil** - Baytown Refinery, TX
Participant as process expert in team to resolve flow issues in liquid sulfur transfer line.

Client: **OnQuest Engineering** - San Dimas, CA
Trouble Shooting for Start Up of amine unit associated with LNG facility.

Client **Chevron** - Hawaii Refinery, HI
On site process engineering support for Flare Vapor Recovery project. Process configuration, energy optimization, waste minimization, improved method for preventing plume opacity, etc.

Client **ExxonMobil** - Joliet Refinery, IL
Sulfur plant optimization study for submission to EPA per consent decree. Development of Preventative Maintenance and Operations plan (PMO) for submission to EPA per consent decree.

Client **OMV Australia** - Perth
Provided specialist expertise in the area H₂S removal and sulfur recovery for onshore processing of gas from the OMV, Sole offshore gas field development. Chemical & Refining Technology Services provided detailed input and led the evaluation process which resulted in selection of the most suitable technology for the OMV project.

Client **SHELL Oil Products** - Puget Sound Refinery, WA
Assistance with reconfiguration of sulfur plant for new operating conditions. Technical evaluation of critical equipment, P&ID review, etc.

Client: **SHELL Oil Products** - Martinez Refinery, CA
Participation in sulfur plant turn around / shut down.

Client: **ExxonMobil** - Chalmette Refinery, LA

Participation in operator training, start up, and performance evaluation. Review of start up / shut down and normal operation procedures.

Client: **Equilon (Shell/Texaco)** - Puget Sount, WA / Westhollow, TX

Outside expert participant in risk / reliability study.

Client: **BOC Gases** - Murray Hill, NJ

Technology commercialization: responsible for bringing stagnant, undeveloped, oxygen based sulfur recovery technology to worldwide recognition, and a dominant market position. Milestones included the sale and successful start-up of the first application using 100% oxygen in a refinery environment, and the subsequent sale of that technology to major oil companies. Also responsible for the sale and successful operation of high level ammonia destruction technology. Participation included significant technical input and project involvement. Clients included Shell, Texaco, Mobil, PDVSA, Exxon, Chevron, and BP.

Client: (Confidential)

Completed a study to determine the economic and technical viability of a project to produce distillate from petroleum coke via gasification and Fischer Tropsch. The study included power generation, and specifically examined the economics of a project based on the coke production from a single refinery in comparison to a larger project based on the coke production from several refineries.

Client: **Tosco** - Wilmington Refinery

Trouble Shooting/Technical Service: Identified cause of high mercaptans in coker gas relative to sulfur dioxide reduction program, and means to improve operation of amine unit. Identified commercially viable options for mercaptan removal.

Client: **Paramount Petroleum** - Paramount, CA

Advised client on process options and relative economics for severely reduced refinery operations. Emphasis on sulfur recovery. Modifications to existing amine/Claus plant versus caustic treating or other alternatives.

Client: **TECNA** - Estudios Y Proyectos de Ingenieria S.A. - Buenos Aires, Argentina

Front End Design Study. Prepared the preliminary design for a turbo expander plant to be located in Argentina.

Client: **Powerine Oil Company** - Santa Fe Springs, CA

Completed study identifying options and evaluating methods to increase sulfur plant capacity (including tail gas unit) required by refinery changes being made to meet the Clean Fuels Act.

Client: **Global Energy Recovery Systems, Inc.** - Paramount, CA

Management/Marketing consultant to Global Energy for the market evaluation of recovered lead dioxide. Identified potential markets, established viability of markets, identified critical issues relating to market and product specification. Assisted in formulating strategic plans.

Client: **Ultramar, Inc.** - Wilmington, CA

Refinery Technical consultant to Ultramar regarding the expansion of existing sulfur plants to meet requirements of the Clean Fuels Project. Identified viable options; prepared technical briefs, and prepared licensor evaluation methodology. Reviewed cost estimates, and licensor bid package.

