Clients engaged in every facet of the downstream industry, from the wellhead to the consumer, rely upon Baker & O'Brien's technical expertise and industry experience in solving unique and complex problems.

These clients include companies engaged in oil and gas gathering; pipeline, water, rail, and truck transportation; gas processing and marketing; petroleum refining and marketing; power generation, water purification, and natural gas distribution; chemical, petrochemical, agrochemical, and specialty chemical manufacture; pulp and paper manufacture; and trade association initiatives.

Baker & O'Brien's work for the downstream industry often includes competitive analysis; feasibility studies; operations analysis and optimization; contract auditing; supply chain analysis; best practices management; accident investigation; market analysis; evaluation of trading and risk management issues; and analysis of organizational strategies and issues.

**RELATED EXPERIENCE**

- **Black Oil Storage**  
  Provided an assessment of terminal facilities in the Long Beach and Los Angeles areas. Assessed historical and projected crude oil supply and demand for California.

- **C4 Upgrade Project Due Diligence**  
  Conducted preliminary due diligence for a project to upgrade various mixed C4 streams into a range of higher valued butylenes streams and chemical products.

- **Clean Fuels Studies**  
  Assisted industry trade associations and government agencies in evaluating issues related to the transition to new clean fuels specifications in the U.S. Work included modeling of refinery operations to determine the impact of the new specifications on manufacturing costs for ultra-low sulfur gasoline and diesel fuels.

- **Crude Oil and Refined Products Business Restructuring**  
  Assessed the viability and financial prospects of a proposed business restructuring designed to eliminate refining operations and develop pipeline supply options. The analysis results facilitated the client's successful efforts to finance and implement the restructuring plan.

- **Crude Oil Evaluation**  
  Assisted an independent California crude oil producer in establishing a pricing formula for sale of its heavy oil production under a long-term contract. The analysis included a historical review of relative crude values and the key price drivers affecting the value differences between grades.

- **Crude Oil Import Terminal Feasibility**  
  Examined the feasibility of a deep water import terminal to meet the domestic refining industry's needs for imported crude oil as West Coast crude production declines. The analysis included a review of the history of imported crude oil for West Coast refineries, the current outlook for domestic production declines, crude oil import trends, shipping logistics, refinery capabilities, and future opportunities for moving crude oils to refining facilities east of the Rocky Mountains.

- **Crude Oil Market Studies**  
  Prepared several detailed assessments of West Coast crude oil markets for an independent California producer. Studies included preparation of detailed regional balances, identification of target refineries for client's crude oil, and estimation of its value relative to imported and domestic alternatives. Results were presented to client's executive management and at its banker and security analyst conferences.

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- **Crude Oil Marketing and Trading Reorganization**
  Conducted review of crude oil marketing and trading practices of major international oil company operating in Europe. Prepared analysis of the organization, key practices, and operating systems. Recommended changes in structure and practices to increase effectiveness, efficiency, and profitability.

- **Crude Oil Marketing Strategy**
  Prepared a marketing strategy for new production in Russia’s Sakhalin Island region. The study analyzed potential markets for new production of crude oil, transportation options and costs, and contracting strategies.

- **Crude Oil Pipeline Acquisition**
  On behalf of an international pipeline company, prepared an assessment of the acquisition of a fifty percent ownership in a pipeline system that transports crude oil from Canada into the U.S. Study included crude oil supply/demand projections for the markets served.

- **Crude Oil Terminal and Pipeline Study**
  Assisted in the site selection study for a new crude oil terminal and a pipeline connecting the terminal to an existing refinery.

- **Crude Oil Utilization Study**
  Assisted an Australian crude oil producer in preparing and submitting a "brief" to the Australian Government regarding the impact of large new volumes of Australian crude oil on the domestic refining industry. Analyzed the crude oil supplies available to each refinery and estimated the new investment that might be needed to process crude oils containing increased volumes of light ends. Assisted in making recommendations to the Government on the framing of new regulations to lessen the impact on both the industry and the consumer.

- **Defective Paint**
  Evaluated automotive paint and coatings data. Analyzed survey data for paint and coatings system performance when applied by a "big three" automotive manufacturer to determine liability contribution for coating failures. Required understanding of evolution of automotive paint and coating systems. Assisted in evaluation of economic damages resulting from coating application failures.

- **Evaluate Biodiesel Technology and Plant Design**
  Reviewed and critiqued plant design for prospective biofuels production facility.

- **Evaluate Biodiesel Technology Development and Scale-Up**
  Assessed the technology development and commercialization plan for a biodiesel production hydrotreating facility. Our conclusions helped provide the basis for the formation of a joint business venture to construct and operate a world-scale biodiesel plant.

- **Fair Market Valuation**
  On behalf of a major U.S. gas power plant developer, estimated the fair market value of a 1,000 MW natural gas-fired electric power project. Evaluated turn key fixed-price contract for engineering, procurement, and construction for the combined-cycle generation facility along with utilities, rights-of-way, and permits. Reviewed the procurement and delivery of four natural gas turbines and two steam turbine generators.

- **Feasibility and Economics to Produce CARB Phase 3 Gasoline and Diesel**
  Performed independent assessment of a refinery project to produce CARB gasoline and diesel. Assessment included feasibility, cost, and economics of the project. Study was performed for a prospective buyer of the refinery.

- **Fertilizer Project Due Diligence Assessment**
  In conjunction with a leading upstream consulting firm, conducted a due diligence assessment of gas resources for the purpose of developing a fertilizer complex associated with onshore and offshore gas production under development. The assignment entailed
delineating the quantity and quality of gas resources available to support the prospective fertilizer project and estimating costs to deliver natural gas suitable for producing nitrogen fertilizers to the project.

- **Fischer Tropsch (FT) Market Study**
  Conducted a market study for intermediate and finished products resulting from FT synthesis of a gas source in West Africa. The study assessed the best markets and projected netback prices for FT diesel, jet, and naphtha, as well as a review of the marketability of intermediate (unfinished) FT products.

- **Gas Processing**
  Performed a preliminary evaluation of the gas processing design, capital costs, and economics for a natural gas liquids recovery and fractionation facility and a condensate stabilization facility in the Republic of Turkmenistan.

- **Global Polyethylene Study**
  Conducted a global market analysis to determine export market potential for a proposed ethylene/polyethylene complex. The study encompassed development of global supply/demand balances and price forecasts, as well as an analysis of prospective competitors’ process economics.

- **Import Terminal Study**
  On behalf of four major oil companies, provided a screening study focused on the Port of Long Beach and Port of Los Angeles to determine the future adequacy of the overall port infrastructure and facilities.

- **Independent Power Production**
  Assisted in the development proposals for two independent power projects in southeastern Japan. One facility, which was successfully implemented, involved a $180 million investment for a petroleum coke-fired 130 megawatt condensing turbine generator. Assisted in the creation of a sophisticated linear program model, which was used to justify the project, based on cash flows and probable rates of return.

- **Lube Oil Market Assessment**
  Conducted a survey of the potential market for naphthenic lubricating oils in South and Central America. Analysis was used to complete a full feasibility study of a new Venezuelan-based refinery to manufacture these products.

- **Lube Oil Market Study**
  On behalf of a major oil company, prepared a forecast of the worldwide supply/demand balance for paraffinic lube oil base stocks to support the development of a new high technology manufacturing facility to be located in Saudi Arabia. Project was a joint venture between the company and the Saudi Arabian government. Output from the project was intended to serve the high growth areas of the Middle East and Far East.

- **Manufacturing Facility and Plant Evaluation**
  Performed an on-site assessment of a pipe manufacturing facility to determine operational viability. Key assessments made on mechanical integrity and reliability of the process equipment, technical understanding and organizational strength of facility personnel, and related operational issues.

- **Marketing Effort for Ecuadorian Crude**
  On behalf of a major international oil trading company, developed ongoing valuations for Ecuadorian Oriente crude oil in the US West Coast and Gulf Coast markets. Client used the results to achieve maximum values for the Oriente crude that it marketed under a long-term contract.

- **Natural Gas Pipeline and Processing Plant Due Diligence**
  Assisted an electric utility in its merger with a gas transmission and distribution company. Inspected pipeline and processing facilities and reviewed natural gas and natural gas liquids supply and marketing issues. Conducted operations review and an
analysis of staffing levels.

- **Oil and Gas Royalty Valuation**
  In support of a potential public offering, calculated the net present value of a defined royalty interest payable on all proceeds from the sale of crude oil, condensate, natural gas, and natural gas liquids produced from the Gippsland Basin in the Bass Strait off the coast of Australia. Worked in conjunction with an oil reservoir firm that prepared field production estimates over the next 20 years. Report became part of the offering memorandum submitted in compliance with local Public Securities Commission regulations.

- **Petrochemical Business Privatizations**
  Developed market valuations, evaluated strategic business alternatives, and formulated short-term planning objectives for several diversified East European chemical companies undergoing the transition from state control to private ownership. Engagements included marketing efforts directed to attracting investors and joint venture partners.

- **Refinery Evaluation**
  Prepared a study of the economics of various alternative operating modes, including expansion through addition of new processing units, for an independent refinery in the United Arab Emirates. Study included assessment and ranking of a variety of feedstocks and processing schemes and utilized a model specifically developed for the refinery.

- **Refinery Manufacturing Options Study**
  Prepared an investment strategy to manufacture transportation fuels. Evaluated yields, investment, and operating economics to produce gasoline and diesel fuel from residual materials. Presented conclusions for consideration by the company's board of directors.

- **Refinery Best Practices**
  Analyzed multiple refineries of a major international petroleum firm to determine economic limitations and causes of performance gaps versus competitors. The study reports consisted of analyses of practices, performance targets, and recommendations for improvement initiatives. The work involved site visits, employee interviews, final reports, and presentations to company management and refinery personnel.

- **Refining Economics Course Development**
  Developed an outline and course material for a refinery and oil sands upgrading course to be given in-house by an operating company.

- **Transmix and Biodiesel Processor Valuation**
  Developed a business valuation for an entity engaged in transmix processing, biodiesel production, and ethanol terminaling. The engagement entailed analysis of historical, current, and projected cash flows from operations to generate an income-based value for the enterprise. The work included updates to valuations of operations previously assessed by Baker & O'Brien, as well as analysis of new facilities.

- **Refinery Integration Study**
  Undertook a comprehensive study of the local Venezuelan refining industry to identify potential areas of synergy between individual refineries and the possibility of closer cooperation to maximize overall industry profitability.

- **Propylene Production**
  Studied the feasibility of reconstruction and expansion of a catalytic dehydrogenation plant at a large Gulf Coast refinery for the production of propylene from propane. The study included evaluation of the current technology, development of costs for reconstruction and expansion, estimation of operating costs, and assessments of regional markets for propylene.

- **Refinery Crude Oil Supply**
  Identified and evaluated feedstocks for a proposed new refinery in eastern Russia. Assessment included contacting potential
suppliers and shippers.

- **Polypropylene Manufacturing Facility**
  Provided a cash flow valuation of a polypropylene complex in support of an ad valorem tax matter. The valuation included analysis of recent historical operations, review of the markets for feedstocks and products, development of operating costs, and analysis of industry trends.

- **Products Terminal Feasibility Study**
  Prepared feasibility study and cost estimate to modernize and increase throughput capacity of a petroleum products terminal on the Black Sea.

- **Petroleum Products Terminal Expansion**
  On behalf of a worldwide independent storage group, undertook a marketing study to support the expansion of an existing petroleum products and chemical storage terminal. Study addressed the potential growth in Southeast Asian products trade, the demand outlook for independent storage, and likely future terminal rates. Expansion proceeded to successful completion based on study results.

- **Replacement Cost Determination**
  Provided a comprehensive estimate of replacement costs for oil and gas producing facilities, offshore production and drilling platforms, gathering systems, storage facilities, and processing plants. These costs were used as a basis for establishing appropriate levels of insurance coverage for a major petroleum corporation.

- **Petroleum Products Market Study**
  Based on visits to major markets in the Southwest Pacific area, estimated the future market demand for petroleum products, including residual fuel and asphalt. Also estimated the potential margins that could be obtained through supplying these small market areas versus larger volume customers. Study was used by a major international oil trading company to establish a long-term strategy for greater market penetration in this fast-growing, high-margin area.

- **Refinery Feasibility Study**
  Directed a feasibility study into a joint venture "grassroots" export refinery in the People's Republic of China. Advised the Western partner during several "rounds" of negotiation with the Chinese partner over a period of two years. Prepared estimates of anticipated rates-of-return for both parties under different economic and cost-sharing scenarios. Assisted in negotiations with local tax and regulatory authorities. Project was shelved following Gulf War.

- **Pipeline Divestiture**
  Undertook a comprehensive market analysis and competitive assessment of a major refined products pipeline system and formed various strategic options for asset disposition. The conclusions developed from the engagement supported the client's subsequent decision to divest certain asset segments.

- **Petroleum Supply Planning**
  Assisted a major Canadian oil company in identifying improvements to its supply-chain planning process. The assignment focused on improvements that could be realized by an integrated oil company that produces, markets, and refines synthetic crude produced from oil-sands.

- **Feasibility Assessment**
  Developed a feasibility study for a large, potentially stranded, natural gas discovery. Constructed an economic model to evaluate potential options for gas monetization, including pipeline natural gas sales, gas-to-liquids (GTL), and liquefaction (LNG). Performed market assessments for the LNG and GTL products.

- **Crude Quality Analysis**
Assisted with crude oil quality analysis from new production field in order to establish initial valuation estimates.

- **Bitumen Diluent Study**
  Developed a market study regarding diluent to be used by Canadian Oil Sands bitumen producers. This included projected supply and demand balances, logistics requirements, and impact from unconventional natural production.

- **Refinery Strategy Meeting**
  Conducted a kick-off session for a day-long senior level strategy meeting. Discussed the client's competitive position and the attributes of top performers.

- **NGL Pipeline Due Diligence**
  Reviewed data presented by a potential NGL pipeline seller on behalf of a potential buyer. The review focused on mechanical integrity and other safety issues.

- **Isobutanol White Paper**
  Evaluated the economic impact of blending isobutanol in place of ethanol for finished gasoline in various U.S. markets. Also evaluated isobutanol as a substitute for purchased alkylate in gasoline blending. Determined the highest value options for blending isobutanol into gasoline. Summarized the results in a White Paper style report.

- **Refinery Valuation**
  Provided an assessment and valuation for potential U.S. refinery candidates for a client considering a refinery acquisition. Analysis included price scenario development and financial modeling to determine indicative offer price.

- **Refinery Technical Review**
  Provided a technical review and forecast of cash flows for a refinery acquisition candidate.

- **Crude oil and Product Price Forecast**
  Developed a crude oil and product price forecast for a client's use in evaluating an investment in a new refinery.

- **Refining and Marketing Privatization**
  Assisted a state-owned integrated oil company in Central Europe in completing a strategic planning study for its downstream refining and marketing business. The study considered potential markets and pricing for crude oil and refined products. Opportunities to optimize the operation and logistics of the company's refining and marketing system were evaluated in view of maximizing the value of the assets prior to privatization.

- **Review of Power Development Projects**
  Evaluated the economic value of five interim power projects in various stages of development for an international power project developer.

- **Commercial Contract Negotiations**
  Assisted with supply contract disputes relating to “take-or-pay” type obligations and “price adjustment” provisions.

- **M&A in the Cement Industry**
  Performed acquisitions (share and asset) with hands on accountability for economic valuations, financial and market analysis, development of strategic rationale, approval documentation / presentations, deal negotiation, due diligence, legal agreements, and management and integration planning.

- **Terminal and Pipeline Studies**
  Managed several competitive assessments of major crude oil and refined products logistics systems, including pipeline transportation and inland and coastal storage terminals.

- **Crude Oil Evaluation**
  Evaluated several processing alternatives and combinations of various refining assets located in the Caribbean and on the U.S.
Gulf Coast to process heavy Ecuadorian crude oil production.

- **Ethanol Supply Demand Evaluation & Pricing Forecast**
  Prepared an evaluation of ethanol manufacturing business for a U.S. company considering major capital investments to enter that business. Developed an analysis which included ethanol supply/demand projections for key gasoline markets, forecasts of future ethanol pricing within those markets, and key sensitivities.

- **Refinery Cash Margin study**
  Provide a comparison of cash refining margins for PADDs 1 through 4 versus expected cash refining margins when inland crude oil transport bottlenecks to the USGC have been relieved.

- **Price Forecast - Northwest Europe**
  Prepared a five-year price forecast for Northwest Europe, considering global and regional supply/demand fundamentals and the relationship between oil and gas pricing, among other factors.

- **Canadian Downstream Petroleum Outlook**
  Evaluated the cumulative effect that regulations and policies may have on the Canadian downstream petroleum sector over the next 20 years.

- **Crude Oil Pipeline System Due Diligence**
  Supplemented the client's team performing due diligence as part of a potential transaction regarding a crude oil gathering and mainline pipeline system. Our focus was on the engineering aspects of new facilities and facilities under construction. We provided an opinion on whether the new facilities, and the facilities under construction, appeared to be designed to applicable industry specifications.

- **Utility Feedstock Contract Evaluation**
  On behalf of a regional utility in central Alaska, evaluated newly proposed long-term feedstock contracts linked to prices on the New York Mercantile Exchange. The proposed price adjustments were based on quality variations from the fuel specifications.

- **Project Management**
  Executed several mid-to-large pipeline and facility projects in multiple international locations, overcoming challenging cultural and language differences. Performed feasibility studies, detailed design, procurement, construction, inspection, hydrotesting, risk assessments, and pipeline integrity.

- **Audit of Gas Contract**
  Conducted an audit of the revenue settlement of natural gas liquids and residue gas per the terms of a gas processing agreement. Investigated causes of reduced product yields, and reviewed compressor operation, fuel consumption, and product and fuel allocation procedures.

- **Product Supply Contract Review**
  Following the notice of cancellation of a product supply agreement based on crude processing, to be replaced with an agreement where refined product prices were to be supplied based on adjustments to posted prices, evaluated the economics of the proposed supply contract compared with the existing crude processing agreement. Determined the required level of discount to OPIS prices to match product cost under the existing crude processing arrangement.

- **Market Analysis and Term Supply Contracting - Synthetic Crude Oil**
  Assisted a Venezuelan joint venture company in developing a marketing strategy for a new synthetic crude oil. The assignment included an evaluation of the potential market for the new production, modeling of refinery values for the new production, detailed assessments of potential supply agreements, and assistance in term contract negotiations.

- **Estimate for Fire Rebuild**
Developed a cost estimate for replacing and/or purchasing new equipment and materials after damage from plant fire.

- **Electric Incident Investigation**
  Conducted a Root Cause Failure Analysis on a power generation facility following the failures of a surge arrester and a backup battery system. Identified required inspection assistance, evaluated failed component inspection results and examined practices and procedures in place at the facility.

- **Gasoline Blending Compliance**
  Provided analysis for a refiner that does not produce finished gasoline on the prospects for producing gasoline that meets all API and ASTM requirements. Analyzed the options available to the refinery for blending reformate fractions and whether aromatics or benzene would likely be the constraining specification as it relates to the "anti-dumping" rule. Evaluated potential early compliance with the EPA's mobile source air toxics (MSAT2) program.

- **Condensate Gathering System Due Diligence**
  Assisted client with engineering due diligence on a Texas condensate gathering system focusing on pipeline mechanical integrity issues.

- **Natural Gas Production Facilities**
  Served as one of two project managers responsible for the engineering, procurement, and construction of a 200 million cubic feet per day natural gas recovery facility in central Algeria to provide the feedstock for a new liquefied natural gas (LNG) plant on the Algerian coast. At the time of installation, the $250-million project was the largest of its kind in the world. Conducted negotiations with local labor, equipment, and utility suppliers. Arranged meetings with local environmental agencies to ensure compliance with all national environmental rules and regulations.

- **Maintenance and Reliability Improvement Program**
  Managed the development of a client's routine maintenance and reliability improvement program that identified areas of concern and implemented new work practices aimed at improving competitiveness. Efforts reduced maintenance costs and improved operating performance.

- **Maintenance Contracting Strategies**
  Worked with international clients to analyze existing maintenance and turnaround contracting strategies, contractor availability, and local cultures to identify areas of concern and develop strategies for improvement.

- **Reliability and Maintenance Continuous Improvement Initiatives**
  Improved efforts to eliminate equipment defects and unscheduled outages by developing and incorporating the use of reliability indices to identify problem equipment. Reliability teams were then able to prioritize concerns to focus reliability improvement initiatives in areas of highest risk to safety, operational performance, and profits. This defect elimination program was utilized as the cornerstone for the plant’s continuous improvement initiatives.

- **Turnaround Optimization Studies**
  Performed numerous turnaround optimization studies and execution reviews for refineries and petrochemical companies worldwide. Areas of focus included analyzing the work selection process, reviewing work execution schedules, evaluating the facilities preparedness to perform the turnaround, and optimizing turnaround cycles or start dates.

- **Performance Improvement Initiatives in Worldwide Refineries**
  Helped design and direct a consulting project to identify the most successful profit improvement initiatives at top performing worldwide refineries. Audited and examined company culture, energy usage, refinery losses, personnel training, safety practices, environmental controls, process operations, technical services, administration, planning and economics, capital investments, maintenance, and reliability factors. Identified and documented those initiatives, which proved most successful, including their
duration, need, and value added. Assignments were in the U.S., U.K., Romania, Korea, and West Africa.

**Natural Gas Asset Strategic Initiative**
Prepared job descriptions and qualifications as part of a new organizational strategy of a fully integrated natural gas division.

**Reformulated Gasoline Study**
Provided a large independent Southern California refiner an assessment of their existing processing equipment, outside feedstocks to be purchased, and new capital investment necessary to produce reformulated gasoline for consumption in the most regulated gasoline market in the world.

**Refinery Acquisition Study**
Provided assessment of refinery technical and economic features for prospective buyer, including on-site inspection and projections of potential capital investments for refinery upgrades.

**Market Study for Crude Oil Rail Unloading Terminal**
Provided an update to a previous report on U.S. light crude oil supply/demand and implications for a new crude oil unloading terminal in a large refining center on the USGC. Supplemented the report with an analysis of heavy crude oil rail transport opportunities.

**Evaluation of Refinery Operating Procedures**
Acted as independent advisor in a dispute between a refinery and the Environmental Protection Agency following a period of excess emissions.

**Tennessee Gasoline and Ethanol Blending**
Provided an expert report and expert testimony on the production and distribution of ethanol and gasoline, particularly branded gasoline, in the state of Tennessee. Provided a refiner perspective of the impact of the Renewable Fuel Standard on gasoline blending, distribution, and marketing operations.

**Pipeline Contamination Dispute**
Assisted in a claim involving an alleged y-grade/NGL pipeline contamination from a gas processing facility. Examined the following key areas to evaluate the claim: pipeline hydraulics, laboratory records, chronology of pipeline sample data, reasonableness of claimed expenses, gas processing facility operation, and records.

**Commercial Contract Litigation**
Assisted in a claim related to a force majeure incident related to the recommissioning of a facility after a hurricane. Examined conformance with standard industry protocols and applicable laws, standards, and regulations. Assessed whether the facility operator acted in a reasonably prudent manner with respect to the commercial and technical issues necessary to safely restart the facility as soon as possible.

**Crude Oil Valuation and Marketing Plan**
Identified target markets, coordinated the assay evaluation, assessed market values, and developed a marketing plan and marketing brochure for a new crude oil to be produced in offshore West Africa. The initial crude oil sales price was estimated, based on quality and location, and was presented in terms of global crude price benchmark grades.

**Planning and Economics Implementation Assistance**
Made an assessment of the implementation plan and "change readiness" associated with a project to improve the short-term planning, optimization, and decision-making processes for a global refining and marketing company. Assessed key stakeholder impressions of the improvement project and provided feedback to senior management to ensure a successful outcome.

**Chemical Pipeline Market Study**
On behalf of an acquisitive client, researched, identified, and characterized chemical pipeline operations in the U.S. to form a
database of prospective business opportunities. The engagement included contacting each prospective target to ascertain an initial level of interest in pursuing commercial arrangements with the client. The study identified several attractive prospects and provided an overall measure of the market dimensions.

- **Ethanol Supply and Demand Study**
  Studied and presented the effects of ethanol supply and demand scenarios on regional gasoline supply and demand for a small domestic refiner.

- **Midstream Acquisition Due Diligence**
  Assisted energy distribution company with due diligence for potential transaction involving gas gathering and processing assets located in the Permian Basin. Assets evaluated included over 4,000 miles of gas and liquid pipelines, four gas processing plants, and multiple gas treating plants. Participated in data room reviews and management presentations with a focus on commercial, operational, and technical evaluations of midstream systems. Developed comprehensive economic model of the integrated gathering and processing assets that was used to determine valuations and evaluate key sensitivities.

- **Benzene Production Study**
  Studied benzene production economics for inland refiner, including benzene price forecast and transportation cost to USGC. Reviewed benzene consumers and future market potential. Estimated the capital cost for benzene production and shipping facilities.

- **Modular Refinery Conceptual Study**
  Performed a conceptual analysis of a small, skid-mounted refinery operating in the Middle East to serve local markets. Assessed the likely configuration and capital costs and yields, given an assumed crude slate.

- **Refinery and Expansion Project Valuation**
  Assisted a refinery owner in establishing a value for an existing refinery, the value of a large expansion project, and the additional value resulting from a guarantee clause associated with the expansion project. The analysis included cash flow modeling, comparative sales assessments, and an evaluation of expansion project capital requirements and economics.

- **Technology Commercialization**
  Performed due diligence on a new gas-to-liquids (GTL) process to evaluate possible routes to commercialization. The work program included the following steps: verification of mass balance, comparison of laboratory and pilot plant yields, evaluation of alternative technologies, assessment of scale-up issues, review of preliminary commercial design, estimate of capital costs, and the development of an economic model that included sensitivity analyses for capital costs, yields, and prices.

- **Construction Dispute - Petrochemicals Plant**
  Prepared a confidential “Cold Eyes Review” assessment concerning a contemplated claim between an owner and a contractor of a grassroots petrochemical facility. Reviewed draft claims, researched evidence, and interviewed key personnel in order to produce an independent view of the claim.

- **Gas to Liquids Evaluation**
  On behalf of a major oil and gas producer, prepared a conceptual design for a Fischer-Tropsch based gas-to-liquids unit using low value associated gas to produce LPG, gasoline, and zero sulfur diesel. Developed estimates of charge and yield, capital and operating costs, and project development and capital spending schedules.

- **Oil Sands Downstream Integration Venture**
  Assisted a producer of Canadian oil sands in assessing potential joint venture partners and refinery acquisition targets for processing diluted bitumen in the U.S. Conducted modeling and analysis of prospective refineries and advised the client on likely capital expenditures required for processing increasing volumes of diluted bitumen. Performed technical due diligence, assisted
Global Gasification Feedstock Analysis
Conducted an analysis of the potential low-cost carbon feedstocks for a grassroots gasification project to produce a combination of synthetic fuels and electricity. The study investigated sources and delivered costs for various feedstocks, including coal, petroleum coke, and low-valued refinery streams such as residuum and cracked fuel oils. Historical data was used to assess pricing mechanisms for world petroleum coke prices, including delivered coal prices to Japan and Western Europe.

Refinery Product Distribution Outlook
On behalf of a large, publicly-traded master limited partnership engaged in the transportation, storage, terminalling, and marketing of petroleum, we assessed the five-year outlook for refinery production, liquid storage capacity, and major pipeline flows on the USGC.

Performance Improvement - Petrochemicals
Assisted in a global study focused on analyzing the operating performance of steam crackers. Participated as a member of a multi-disciplined team responsible for: reliability and operations data gathering, analysis, plant personnel interviews, and industry benchmarking of performance. The study concluded with numerous recommendations to company senior management aimed at improving worldwide plant operational availability.

Crude Oil Gathering System Evaluation
On behalf of an independent U.S. refiner, conducted an in-depth study of its crude oil gathering and transportation system. Our study included reviews of physical assets and crude oil purchase and transportation agreements, and evaluation of the economics of retention versus disposition. Our results and conclusions were used by the client in its asset rationalization plans.

Contract Dispute Resolution
Evaluated inter-company petrochemical stream transfers and cost allocations pursuant to the mutually agreeable resolution of a contractual dispute between entities engaged in multiple across-the-fence feedstock and product exchanges.

Project Feasibility and Start-Up Assistance
Retained by a financial institution to conduct an independent assessment of a refinery project to restart and expand idle equipment to produce transportation fuels and lube base oils. The feasibility analysis included review of project costs, a product price forecast and margin outlook, as well as an assessment of the competitive market environment. Provided assistance to the lender in structuring terms for loan agreement and establishing project milestones for the funding. Monitored construction and revamp progress for the lender and certified mechanical completion of the project. Following start-up of the units, attended performance test runs and provided certifications to the lender that the units met design throughput capacities and products met required quality specifications.

Planning and Scheduling Improvement
Assisted an integrated oil company in improving its processes and tools for crude oil pipeline scheduling, refinery short-term planning and optimization, refinery scheduling, and performance measurement. The initiative was part of a large, company-wide implementation of SAP and focused on improving the processes and methods of integrating data between the decision support tools and the data warehouse (SAP BW). Tools included refinery LPs, refinery scheduling tools, assay systems, and batch pipeline scheduling software.

Crude Oil Royalty Litigation
Assisted in a lawsuit between an oil company and a royalty owner of oil company’s crude oil production for alleged underpayment. Work included identification of the various markets for this crude oil to established whether its value in these markets was consistent with the price received.
Monterey Shale Oil Study
On behalf of a California refiner, reviewed the potential for production of Monterey shale crude oil in the San Joaquin Valley and the accessibility of this crude to the client's refining system.

Shale Oil Market Study
Prepared market study for upgraded shale oil in several refining centers over extended project life. Estimated refining value and ocean freight in selected refineries to yield netback value at upgrader dock. Compared estimated refining value for upgraded shale oil to estimated refining value of typical swing crudes for each region.

Refinery Equipment Sales
Assisted the owner of a 60,000 BPD crude oil refinery in developing a marketing plan and finding potential customers for used process equipment. The assignment generated a sale of several major processing units to a local refiner for use in the manufacture of high-octane gasoline blending stocks.

Asian Refinery Study
Assisted client in building PRISM refinery models of several Southeast Asian refineries.

Bitumen Economics/Refinery Reconfiguration
Using the PRISM refinery simulator, calculated the economics of replacing the current refinery crude slate with Canadian synthetic-bitumen (syn-bit) or condensate-bitumen (dil-bit) blends. Cases were considered with and without capital investments and potential investment costs were also estimated.

Bitumen Processing Study
Used our proprietary PRISM refinery model to determine the bitumen processing capability of several U.S. refineries.

Carbon Dioxide Forecast
Using the PRISM refinery simulator, calculated and compared the carbon dioxide emissions for two processing options: (1) a bitumen upgrader in Canada combined with a refinery in the U.S. versus; (2) an integrated upgrader/refinery at the U.S. location.

Crude Oil Valuation
Conducted a valuation for a new grade of Atlantic crude oil production, likely to be marketed to refineries in the U.S. East Coast and U.S. Gulf Coast. The study used PRISM for several specific refineries to calculate refinery breakeven values for the target crude in comparison to several competing grades. The analysis also included a historical review of the calculated relative crude refining values and the key price drivers affecting the value differences between grades.

Crude Oil Supply Study
Assisted client in constructing a crude oil supply balance for PADD II and developed incremental crude oil valuations for refineries in PADD II using PRISM, Baker & O'Brien's proprietary refining industry analysis tool.

Ethanol Impact on Refinery Margins
Assessed the impact to U.S. refining margins that would likely result from aggressive growth in ethanol production in the U.S. The study examined the likely distribution of ethanol by PADD under an aggressive ethanol growth scenario, the resulting gasoline supply and demand balances, and the consequent impact on margins over a 10-year period.

Grassroots Refinery Study
Built a grassroots refinery model using our proprietary PRISM refinery modeling system. Our client (a PRISM licensee) then used the model to evaluate the economics of various refinery configurations.

GTL Diesel Blending Study
Performed several diesel blending studies in different refinery configurations using PRISM to calculate the Green House Gas benefits of using GTL diesel as a potential blendstock.
HF Alkylation Restrictions Impact Analysis
Investigated and analyzed the impact of various potential restrictions on the use of HF alkylation technology in U.S. refineries.

Impact of Gasoline Toxics Regulations
Quantified the impact of proposed changes in gasoline toxics regulations (MSAT-II) on each individual refinery in the U.S. Using our proprietary PRISM refinery modeling system, calculated investment costs, changes in operating costs and product yields. Our report was presented in testimony before the U.S. E.P.A.

Isobutanol Valuation Study
In order to assess the potential value of isobutanol as a gasoline blending component, performed simulations of refinery operations at a select group of West Coast refineries to calculate isobutanol value relative to blending ethanol into gasoline.

Market Impact of Low Sulfur Fuels Regulations
Using our proprietary PRISM refinery modeling system, performed a refinery-by-refinery analysis of potential production of low sulfur fuels by U.S. refineries. Analysis included the seasonal productions of conventional and reformulated gasolines and ULSD and also included jet fuel and high sulfur diesel production.

Multi-Refinery Synergies
Analyzed the synergies and economic advantages of companies that operate multiple refineries on the U.S. Gulf Coast. Analysis included advantages in crude acquisition; turnaround and routine maintenance; feedstock and product transportation; efficient processing of intermediate streams; and optimal capital investment.

Oil Refining Crude Supply Dispute
Provided engineering and project management consulting services for litigated dispute between two large oil companies concerning an acidic crude oil supply agreement (high TAN crude, high acid crude). Prepared expert report.

Supply/Demand Forecast
Constructed PRISM refinery models of all of the Australian refineries for use by a client for its strategic planning efforts.

RFS Infrastructure Study
Prepared a report for the American Petroleum Institute (API) that analyzed the potential logistics and infrastructure bottlenecks on a year-by-year basis to 2012 that could result from the industry trying to meet the Renewable Fuel Standard from the Energy Independence and Security Act of 2007.

Refinery Competitiveness Study
Analyzed the relative competitiveness of a group of refineries in a specific region. The study included an analysis of the local supply and demand balance, and a forecast of product movements into and out of the region. Using our proprietary PRISM system, modeled each refinery in its current configuration and in its expected configurations eight years in the future. Profit margins were calculated for each refinery under three different product price scenarios.

Refinery Competitiveness Study
Prepared a competitive positioning analysis for a Midwest Refinery that incorporates the impacts of the proposed Cap and Trade legislation in Congress. Addressed the potential financial impacts of Cap and Trade on the refining industry in PADDs 2 and 3.

U.S. Refining and Marketing Strategy
Advised a client on developing strategic options as it relates to future participation in the U.S. refining and marketing sector. Developed scenarios and assessed the medium term outlook for refining and marketing in the U.S. to support client objectives. Prepared short list of potential candidates for acquisition, and developed case studies and recommendations related to post merger integration activities. Advised client on appropriate timing for executing strategic objectives.

Refinery Oil Sands Processing Capability
Conducted refinery modeling and developed a preliminary assessment of the current and future capabilities of several U.S. refineries for processing diluted bitumen. Prepared initial screening estimates of likely "Phase 1" capital projects for significantly increasing the capability to process blended bitumen. Conducted analysis of likely future competitiveness of same refineries in the regions of operation.

**U.S. Gasoline Study**
Performed an independent analysis to determine the potential supply and cost impacts of a new National Clean Gasoline Standard that would significantly lower the Reid Vapor Pressure (RVP) and sulfur allowed in gasoline. A refinery-by-refinery analysis was performed that considered each refinery's compliance options accounting for technical, strategic, market, and economic factors, and then estimated a likely response based on this information.

**U.S. Gasoline Study**
Performed an independent analysis to determine the potential supply and cost impacts of a new National Clean Gasoline Standard that would significantly lower the Reid Vapor Pressure (RVP) and sulfur allowed in gasoline. A refinery-by-refinery analysis was performed that considered each refinery's compliance options and likely response considering technical, strategic, market, and economic factors.

**HF Alky Study Sensitivity Case**
Investigated and analyzed the impact of various potential restrictions on the use of HF alkylation technology in U.S. Refineries.

**PADD 1 Refining Study**
Provided a competitiveness analysis of refineries located in U.S. PADD 1, U.S. Virgin Islands, and Eastern Canada. Developed a price forecast and historical supply and demand balance. Provided a competitive ranking of a prospective acquisition of a refinery in the region being considered by the client.

**Refinery Yield and Hydrogen Balances**
Provided client with yield and hydrogen balance estimate for a group of Canadian refineries using our proprietary PRISM modeling system.

**Supply/Demand Forecast**
Prepared a forecast of U.S. refined product consumption and production using our proprietary PRISM refinery modeling system for the year 2012.

**Refinery Force Majeure Claims**
Prepared expert reports and testified in an international arbitration involving multiple product supply disputes between a refinery and an adjacent chemical plant. Reviewed force majeure claims related to catalytic cracking technology, product supply contracts, and utility supply interruptions.

**Gasoline Pricing Dispute**
Analyzed gasoline price anomalies that developed after a major hurricane made landfall on the U.S. Gulf Coast. Provided technical support for the use of Gulf Coast spot market pricing as the basis for gasoline sales contracts.

**Refining and Supply Strategy**
Assisted the European division of a major integrated oil company in the development of a refining and supply strategy for its refining and marketing business in Western Europe. The assignment included the benchmarking of the client's current performance versus competitors, development of future market scenarios, and projections of financial performance for various strategic initiatives that could be implemented by the refining business unit.

**Refining and Marketing Performance Benchmarking**
Developed and maintained a quarterly benchmarking service for a consortium of refiners and marketers with operations in the U.S.
The publication reported key financial and productivity benchmarks on a quarterly basis to subscribers for use in competitive analysis and strategy formulation.

- **Long-term Outlook - Global Refining and Light/Sweet Crude**
  Completed a study that examined longer-term developments of the worldwide refining industry and strategies for maximizing the sales value of light, sweet crude grades. The study identified and evaluated a long-term pricing strategy for light/sweet crude oil as a response to expected changes in crude oil quality, environmental legislation and mandates, and regional growth trends in petroleum demand.

- **LNG Project Development**
  Commercial responsibility for the upstream development of a number of non-operated gas fields associated with a world-scale LNG project. Involved in numerous gas purchase and sale agreements associated with managing the project’s upstream gas portfolio ahead of first LNG in 2015.

- **Wellhead Value - Natural Gas**
  Provided opinion with respect to effect of capital recovery of production facility costs on wellhead value of natural gas.

- **Refinery Marketing Study**
  Surveyed existing and potential customers regarding proprietary slurry oil separation. Evaluated responses to determine the industry's perception of the technology and quantified the potential value for refinery customers.

- **Lube Oil Re-Refining Assessment**
  Prepared an assessment of lube oil re-refining plant to determine causes of problems related to reliability and operating performance.

- **Study of Planning Processes**
  Assessed the monthly planning and optimization process and identified recommendations to address significant limitations to profitability improvement. Reviewed the linear program model and conducted interviews of key personnel involved in the planning process, including crude selection, refinery processing, LP optimization, product distribution, and product marketing.

- **West Coast Refining Strategy**
  On behalf of a West Coast refining company, we estimated the cash margin of all PADD 5 refineries under four different price scenarios. These competitive margin assessments were presented for 2015, 2020, and 2025 and accounted for the cost of compliance with CO\(_2\) regulations and other environmental regulations that were applicable to each scenario.

- **Refinery Integration Analysis**
  Using PRISM, investigated and analyzed the potential value that two refiners might capture through the consolidation of operations of two neighboring refineries. The analysis was performed under multiple price scenarios.

- **Refinery Venture Development**
  Performed economic evaluation and developed comprehensive financial models for a West Coast refinery restart and upgrade program. The engagement included market analysis, evaluation of investment options, and support of project financing efforts.

- **Refining Market Forecast**
  Prepared a ten-year price forecast for a petroleum refiner for use in its long-range plan development. Reviewed current downstream refining industry trends, including supply and demand balances, environmental regulations, and regional crude oil pricing to develop the outlook.

- **Review Infrastructure Assets**
  Assisted client in evaluating infrastructure spending to support ongoing operations and maintenance activities. Our review evaluated whether the infrastructure assets were integral to the overall technological complex.
Refining Margin Forecast
Prepared a ten-year price forecast for a petroleum refiner for use in its long-range plan development. Reviewed current downstream refining industry trends, including supply and demand balances, environmental regulations, and shifts in regional crude oil pricing to develop a future downstream industry outlook.

Due Diligence of a Lube Re-Refining Facility
Conducted a due diligence analysis of technical and economic features of a lube oil re-refining plant involving a potential acquisition.

Biodiesel Plant Construction Dispute
Evaluated engineering and construction practices in a dispute between an owner and EPC contractor due to cost overruns. Issues included engineering and project management practices which required rework, and construction practices which created safety and operability issues. Cost estimates were prepared for correcting the deficiencies.

U.S. Midcontinent Crude Valuation
Evaluated crude oil refining values and logistics for several targeted refineries in the U.S. midcontinent area. Evaluated expected price parity points for domestic crude oils versus competing grades delivered to the refineries via pipeline.

Refining Strategic Analysis
Using PRISM, performed a competitor analysis of over 20 refineries that potentially competed with client refinery. Developed refinery cost curves under multiple crude oil and product price scenarios and identified key characteristics of those refineries which operated at the low end of the cost curve.

Gasoline Market Study
Provided an analysis of the gasoline market in several mid-continent cities, including a twenty-year price forecast for a client considering market entry.

Crude Oil Supply Evaluation
On behalf of a major pipeline and terminal company, prepared a detailed assessment of future crude oil supply and demand balances for the U.S. West Coast, with an emphasis on California. The assessment was used by the client as a key part of its justification for a new crude oil import terminal, capable of handling VLCCs (Very Large Crude Carriers), to be constructed in the Port of Los Angeles. Results were presented to community and state government groups.

Refinery Feasibility Study
Studied the possible development of a grassroots refinery that included an assessment of the refinery's potential feedstock, refined product yields, operating costs, and earnings capability. Utilizing Baker & O'Brien's proprietary PRISM refining industry analysis software and data services, developed a ten-year outlook for refining margins/crack spreads, modeled alternative refinery configurations, and conducted a competitive assessment of the proposed refinery compared to key regional competitors.

U.S. Refinery Competitiveness Assessment
Assessed the expected future competitiveness of U.S. refineries in PADDs 1, 2, 3, and 5. Developed a base scenario and price outlook to evaluate future relative cash margin performance for over 90 refineries considering large expansion projects. Examined effects of key sensitivities, such as light/heavy crude oil price spreads, effects of carbon regulation, and the price differential between gasoline and diesel.

Propane Storage Assessment
Prepared an analysis of an underground propane storage system to determine causes of leakage and potential corrective actions.

Refinery and Pipeline Systems Valuation
Provided values of a refinery, crude oil gathering, and products marketing system to be recorded as fair values for purchase price
allocation purposes.

- **Ultrafines Study**
  Provided an analysis of the economic impact of the presence of ultrafines in a Canadian mined bitumen upgrader operation. Quantified the capital and operating cost mitigation steps required by a mined bitumen upgrader operation to address the impacts associated with ultrafine solids present in the mined bitumen. Prepared a written report and presented results.

- **Review Project Development Costs**
  Evaluated multi-million dollar cost overruns of yearly operating budgets of a Central Asian consortium involved with the oil and gas development and production. Costs reviewed included Engineering Support, Operating Costs, Drilling Costs, and Capital Expenditures.

- **Refinery Contractor Indemnification Dispute**
  Provided expert opinion concerning an indemnification dispute between a refiner and contractor, as well as the standard of care and practice in the industry concerning the design and construction of a piping relief system. Also opined on the refinery owner’s responsibilities concerning the acceptance and maintenance of completed piping systems.

- **Reorganization of Crude Oil Trading Business**
  Analyzed crude trading business for potential reorganization.

- **Retail Marketing Business Development**
  Assessed Mid-Continent petroleum retail markets and competitive environment on behalf of a prospective retail market entrant. Pro forma economics were prepared for various retail business configurations to determine entry strategy options and assess the client's development objectives.

- **Wholesale Trade Practices**
  Assisted a South American national oil company in reviewing trade practices for the wholesale marketing of petroleum products. Advised the client on wholesale price formation and marketing practices in free markets.

- **Strategic Sourcing: Refining Materials and Services**
  Assisted a major, integrated oil and gas company in implementing a strategic sourcing initiative for its refining and petrochemical businesses. The initiative focused on developing a strategic and low cost supply of sulfuric acid, process chemicals, and maintenance services to the client's various refining and petrochemical facilities, which achieved cost savings of up to 25%.

- **Root Cause Analysis**
  Conducted a Root Cause Failure Analysis on a high pressure steam turbine that failed following a planned outage at a cogeneration power plant. Evaluated outage work procedures, actual outage work undertaken, start-up monitoring results, and post-failure turbine inspection results on turbine disassembly.

- **TEL vs. MMT Blending Study**
  On behalf of a chemical supplier, reviewed the use of tetraethyl lead (TEL) as an octane enhancing gasoline additive in a Middle Eastern country from 2000 to 2006 compared to using methyl cyclopentadienyl manganese tricarbonyl (MMT).

- **TEL Usage in Southeast Asia**
  On behalf of a chemical supplier, reviewed the use of tetraethyl lead (TEL) as a gasoline additive in a Southeast Asian country from 1999 to 2005 compared to the technical requirement based on the quality of the country's base gasoline and the required octane target.

- **Terminal Facility Valuation**
  Reviewed the operating results and management projections for a terminal and transmix processing facility to develop an income-based valuation for the business enterprise. This engagement was one of a series of valuations prepared by Baker &
O’Brien to support the financing requirements for this business since its inception.

- **Joint-Operating Agreements**
  Responsible for joint venture management with a mandate to ensure operator compliance within operating agreements (JOAs).
  Responsible for overseeing non-operator audits with a goal to bring about greater operator accountability and transparency.

- **Chlorine Contract Dispute**
  In a lawsuit involving a long-term chlorine supply contract, provided litigation support relating to a series of force majeure events.
  Analyzed the chlorine producers options to mitigate the loss of contracted sales volumes.

- **Refining Assessment**
  Analyzed the profit improvement potential for an asphalt and naphthenic lube specialty refiner, which focused on the existing operating and planning practices of several refineries in the network. Recommended several zero capital cost improvements to be implemented.

- **Product Pipeline and Terminal Valuation**
  Prepared a valuation of a pipeline and related terminal associated with client's refinery. The valuation was used by the client for accounting and tax allocation purposes.

- **US Crude Oil Market Analysis**

- **Ethanol Blending Lawsuit**
  Working on behalf of a petroleum industry trade organization, in defense of major gasoline branded companies, provided analysis and opinions related to the potential impact on brand quality from allowing ethanol splash-blending by third parties. Provided expert testimony at trial.

- **Crude Oil Terminal Study**
  Surveyed existing crude oil storage costs on the U.S. Gulf Coast. Evaluated current and future crude oil storage capacity on the U.S. Gulf Coast, and developed an outlook for near-term crude oil storage costs. Provided input to client's greenfield crude oil terminal project.

- **Black Wax Crude Oil Market Study**
  Reviewed qualities of Utah Black Wax crude oil versus other sweet crude oils to determine key criteria which would lead a refiner to process to Utah Black Wax crude oil. Used criteria to screen existing U.S. refineries for their ability/incentive to process the Utah Black Wax crude oil.

- **Refinery Feasibility Study**
  Evaluated the economic feasibility for constructing a new grassroots refinery in the U.S. Mid-Continent. Developed a forecast for the feedstock and product prices. Utilized preliminary process design data to construct an economic model for two different refinery configurations. Identified the major variables which impacted the refinery economics.

- **Refinery Hydrogen Demand Study**
  Quantified the hydrogen demand impact due to Gasoline Tier 3 regulations, the changing crude supply, and product demand in the USGC over a ten-year horizon.

- **Leadership Development Program**
  Provided a leadership development program for an international refining and marketing company executive. Areas of focus included U.S. refining, marketing, crude oil and transportation practices and trends.

- **Northwest Europe Price Forecast**
Developed a five year outlook for crude oil, refined products and petrochemical prices for a European refining company.

- **Crude Oil Valuation Study**
  Estimated the value of various crude oil grades in a number of refineries that compete for the acquisition of local crude oil production in the U.S. mid-continent.

- **Crude Oil Pipeline Due Diligence**
  Provided technical, commercial, and market due diligence for acquisition of pipeline transportation rights in Latin America. Carried out a technical review of the oil pipeline and pump station facilities. Reviewed the tariff setting mechanism and analyzed key inputs. Developed a tariff model and ran sensitivity scenarios to predict future pipeline tariffs. Carried out regional market study to compare alternate transportation modes (pipeline versus truck) and reviewed forecasts for crude oil production and transportation.

- **Isobutanol Blending Study**
  Evaluated the gasoline blend value of isobutanol versus ethanol for a Midwest refinery. Calculated isobutanol blend values for summer and winter and for constrained and unconstrained gasoline production.

- **Refinery Acquisition Screening and Valuation**
  Provided refinery modeling, valuation and M&A support for a client that was considering a refinery acquisition.

- **PADD 4 Products Supply/Demand Study**
  Forecasted PADD 4 refined products supply and demand through 2020 considering potential refinery expansions, refining economics, logistics and product consumption trends. Outlined the potential implications of changing supply/demand patterns on PADD 4 refined product prices.

- **Refinery Competitiveness Study**
  Conducted a study of the competitiveness of a refining company’s three refineries for a client contemplating the establishment of a partnership with the refining company.

- **Refinery Scenario Development Workshop**
  Facilitated a workshop with the senior management of a refining company to develop scenarios which would be used in deciding whether to install a hydrocracker or retrofit an existing FCC. Developed crude oil and refined product price sets corresponding with each of the scenarios.

- **Refining Margin Forecast**
  Prepared a ten-year price forecast for a petroleum refiner for use in their long range plan development. Reviewed current downstream refining industry trends including supply and demand balances, environmental regulations, and WTI/LLS pricing to develop a future downstream industry outlook.

- **Refinery Study**
  Prepared margin reports for four refineries to be used by the client for screening potential acquisition targets. Developed the yield and prices based on publicly-available data. Evaluated options to process Eagle Ford crude oil at one refinery and also build a distillate hydrocracker.

- **Crude Oil Market Study**
  Provided a forecast of North American crude oil production through 2030 by quality and by major producing region. Evaluated the extent to which the North American refining industry could accommodate a lighter crude oil slate. Identified expected change in crude flow patterns and imports.

- **Refinery Strategic Review**
  Provided a strategic review of a client’s refinery with a focus on the potential opportunities and threats related to evolving crude oil supply dynamics and competitor expansions.
- **PRISM Refinery Data**
  Provided refinery capacity, throughput, product yield, and cash flow estimates for two European refineries in support of preliminary acquisition discussions.

- **U.S. Crude Oil Study**
  In response to increasing production of U.S. light crude oil, estimated a range of light crude oil prices that would be required in order for moderately complex refiners to break-even versus processing medium crude oil. Developed a forecast for North American crude oil production by major producing basin in order to understand the point in time at which essentially all light crude oil imports would be displaced from the North America market.

- **GTL Technology and Cost Evaluation**
  Evaluated the technology, cost estimate and financial model for a small scale GTL project to convert natural gas to liquid specialty products. The project evaluation included a review of the synthesis gas process, Fischer-Tropsch (FT) reactor technology, product recovery and product separation. The project definition and stage of development were evaluated for technology risk, cost estimate range of accuracy and suitability of the financial model assumptions.

- **Ethanol Plant Operating Cost Study**
  Compared the estimated cash operating costs for approximately 50 U.S. ethanol plants to the costs for a client's potential ethanol plant acquisition target. Ranked the acquisition target on six separate cash cost metrics and presented the results.

- **Strategic Review of Refining Portfolio**
  For a large integrated refiner and marketer, assessed the historical performance of each refinery in the company's system, and evaluated key benchmark metrics against various selected peer groups. Reviewed each refinery's competitive position and highlighted the key factors that differentiated its performance. Quantified the performance gaps on a dollar-per-barrel basis, attributed the gaps to controllable or structural factors, and made recommendations for improving the controllable gaps.

- **Natural Gas Midstream Due Diligence**
  Conducted due diligence on gas gathering assets in East Texas for a prospective purchaser. Inspected facilities, reviewed pipeline and facility construction records, confirmed regulatory status, evaluated pipeline integrity management program, and assessed process safety.

- **Refinery Screening and Evaluation**
  Provided cash flow forecasts and indicative transaction values for select target refineries using PRISM charges and yields and client price forecasts.

- **North Carolina Gasoline and Ethanol Blending Analysis**
  Provided an expert report on the production and distribution of ethanol and gasoline, particularly branded gasoline, in the state of North Carolina. Provided a refiner's perspective of the impact of the Renewable Fuel Standard on gasoline blending, distribution and marketing operations, considering the options, alternatives and risks of selling gasoline without ethanol.

- **Refinery Olefins Production Model**
  Developed a refinery olefins model that has the capability to predict propylene and butylene production and consumption for the U.S., at the individual refinery level. The model provides the user with an ability to toggle between different FCC conversion levels and to adjust several other key parameters.

- **Pump Failure Investigation: Maintenance Shop**
  Reviewed rotating equipment maintenance shop's pump maintenance and rebuild procedures. Provided written report describing potential causation of power plant rotating equipment failures and recommendations to improve maintenance shop quality control.

- **Crude Oil Rail Transport Study**
Provided an assessment of refinery crude oil processing capability and crude oil pipeline receipt options to enable client to assess crude-by-rail options that might be available to U.S. refiners.

- **Prepare Northwest Europe Price Forecast**
  Prepared a five year price forecast for crude oil, refined products and petrochemicals in Northwest Europe.

- **Strategic Review of Ethanol Plants**
  Provided a strategic review of an ethanol production business, including the analysis of ethanol plant operating costs compared to regional and ethanol industry competitors. Provided ethanol production margin forecast and made recommendations on whether to continue operations, invest in plant improvements, or exit the business.

- **Refinery Competitive Assessment**
  Conducted a refinery assessment for a natural gas supplier that was considering investing in infrastructure to enable one of their refining clients to increase capacity. The assessment included a refinery competitive analysis and cash flow forecasts under multiple scenarios.

- **Isobutanol Valuation Versus Ethanol**
  Prepared isobutanol vs. ethanol valuations for gasoline blending at several U.S. refineries. Assessed blend values for refineries producing reformulated gasoline, low vapor pressure gasoline, and California Air Resources Board (CARB) gasoline.

- **Shale Oil Prefeasibility Study**
  Assisted client with determining the economic optimum product quality for Synthetic Crude Oil (SCO) to be produced from retorted shale oil. Determined the potential impact of various SCO qualities on refining customer process units and estimated the potential revenue changes that would result from adjustment of these qualities.

- **Crude Oil Terminal Study**
  Assisted client in identifying new crude oil business opportunities for a large off-shore oil terminal that it had recently acquired. Analyzed regional crude oil supply and demand patterns and expected trends, and considered other opportunities such as crude oil blending.

- **Refinery Business Interruption Assessment**
  Estimated the lost profit (business interruption claim) stemming from a contractor incident which caused an extended refinery outage.

- **Process Plant Fire Protection Review**
  Reviewed fire protection recommendations by other firms and assisted client in understanding API and NFPA standards that are generally applicable in the process industry.

- **Refinery Valuation and Synergy Analysis**
  On behalf of two international refining companies, investigated and estimated the potential value of synergies that might be realized upon the combination of the two refineries. Provided indication of value capture, based on criteria provided by companies.

- **Refinery Demurrage Claims**
  Reviewed ship demurrage claims regarding refinery force majeure issues. Developed report on issues including residual fluid catalytic cracking (RFCC) operations and prudent operating procedures.

- **Evaluation of New Crude Production**
  Evaluated a new crude oil stream produced by the client from offshore platforms in the West African country of Equatorial New Guinea. Evaluation included identification of potential markets and the values of this crude oil into these markets.

- **European Refinery Competitiveness**
  On behalf of a large industry participant, evaluated the relative competitiveness of refineries operating in Western Europe. Utilized
our proprietary PRISM modeling and database system to extract individual refinery margin and cost metrics and projected the likely future positions of the client's refineries on the cost and margin curves.

- **Refinery Due Diligence Support**
  Provided due diligence support for potential refinery acquisition. Developed cash flow models for valuing the refinery. Developed price forecast used in cash flow model. Evaluated key drivers and their impact on the refinery valuation.

- **Refinery Fire Claim**
  Provided litigation support for a valve supplier with regards to an insurance subrogation claim associated with a refinery fire. Determined extent of damage, cost and time to repair, and estimated business interruption if refinery facility had been designed per normal industry standard.

- **Refining Company Financial Analysis**
  Prepared a financial analysis of an independent U.S. Refiner and Marketer in support of a valuation for a prospective buyer.

- **Crude Oil Storage Study**
  Supported various feasibility studies related to development of a crude oil storage project on the U.S. Gulf Coast. Activities included a survey of Houston and Port Arthur-area crude oil storage costs, an assessment of medium term lease rates, and an evaluation of days of crude oil storage, both historically and projected, given the changing crude oil flow dynamics from the Eagle Ford and Permian regions.

- **Gas Plant Due Diligence**
  On behalf of a developer's due diligence process, provided an independent review of a gas plant project in the U.S. Reviewed documents and consulted with the developer regarding the process design, engineering, major systems and equipment, procurement, construction, schedule and CAPEX.

- **Logistics services company assessment**
  Provided an independent financial and commercial assessment of a logistics services company that our client was considering purchasing.

- **Condensate Splitter Due Diligence**
  Conducted asset due diligence activities: inspected facility under construction; provided market incentives, operating costs, risk overview, and staffing recommendations for successful acquisition of condensate splitter and associated logistics.

- **Crude Oil Marketing Study**
  Evaluated options for marketing light tight crude oil (LTO) including calculating the breakeven refining value in specific refineries and its value as diluent in a diluent-bitumen blend.

- **Refining Margin Forecast**
  Provided a 10-year refining margin and price forecast for use by client in developing their long-range plan. Provided historical trends and identified drivers which could impact future refining margins.

- **LNG Capital Cost Review**
  On behalf of potential offtakers and equity investors of one train, Baker & O’Brien performed a follow-up review of the updated Open Book Estimate (OBE) of a two-train liquefaction project, including common use of certain existing regasification facilities.

- **Refinery Due Diligence Assessment**
  Provided an initial assessment of a Gulf Coast refinery for possible acquisition by the client. Provided estimated refinery yields and profitability.

- **Environmental Impact Support - Rail Terminal and Refinery**
  Prepared an expert report on behalf of a local government agency, as part of an environmental impact process, to address the key...
technical changes resulting from a project to construct a crude oil rail terminal and modify an existing refinery to allow it to process increased amounts of light domestic crude oil.

- **Refined Products Terminal Study**
  To support a client's due diligence efforts for a potential petroleum products terminal acquisition, undertook a market study to evaluate the current refined products supply and demand balance on the U.S. Gulf Coast. Key market drivers were identified which could impact future market growth.

- **Permian Basin Market Review**
  Analyzed Permian Basin crude oil production, production forecasts, infrastructure projects, and price differentials for a midstream company. Provided input for annual investor presentation.

- **Refinery Acquisition Planning**
  On behalf of an acquisitive client, developed a summary of the U.S. refining business to focus on the supply/demand and competitive forces within the market. Provided information regarding historical U.S. refinery M&A transactions and a summary of typical due diligence focus items. Screened several potential acquisition candidates and developed a shortlist of opportunities which appeared to best align with the strategic objectives of the client.

- **Crude Oil Flow Projections for Pipeline Acquisition**
  Evaluated the current regional supply and demand balance for crude oil and developed medium-term forecasts, given expectations for area refinery expansions and crude oil production changes. Developed projections for crude oil transportation volumes in an existing crude oil trunkline that was considered for acquisition.

- **Condensate Splitter Due Diligence**
  Conducted asset due diligence activities: (1) inspected facility under construction; (2) provided market incentives; (3) operating costs; (4) risk overview; and (5) staffing recommendations for successful acquisition of condensate splitter and associated logistics.

- **Condensate Splitter Market Study**
  Developed market study and economics for a "grassroots" Eagle Ford condensate splitter located in Corpus Christi. Evaluated alternate locations and presented to CEO and management.

- **Oil Disposition Study**
  Developed economics of crude disposition alternatives for producer's growing production of light tight oil. Alternatives included local and distant refining values with appropriate logistics costs.

- **Nitroparaffin Manufacturing Evaluation**
  Evaluated technology and patents related to the production of nitroparaffins.

- **GTL Technology Assessment**
  Assisted company in evaluating a larger equity investment in a GTL technology company by visiting the prototype unit, reviewing process data, and assessing the potential market.

- **GTL Commercialization Study**
  Performed due diligence on a new GTL process to evaluate possible routes to commercialization. The work program included the following steps: (1) verification of mass balance; (2) comparison of laboratory and pilot plant yields; (3) evaluation of alternative technologies; (4) assessment of scale-up issues; (5) review of preliminary commercial design; (6) estimate of capital costs; and (7) the development of an economic model that included sensitivity analyses for capital costs, yields and prices.

- **Waste to Liquid Process Evaluation**
  Performed an economic and technical screening evaluation for a client-provided process for conversion of animal waste to hydrocarbon products. Researched current patented technology as well as investigated theoretical mass balances for
feed/products.

- **Refining Alternative Crude Study**
  Prepared an evaluation of the economics of processing alternative crude oils in a Midwest refinery.

- **Pipeline Contractor Business Interruption Claims**
  Reviewed business interruption claims made by welding contractors related to a pipeline incident that resulted in damage to the contractors’ equipment. Prepared a report documenting our findings of the business loss claims.

- **Refinery Feasibility Study**
  Prepared a feasibility study for a client considering a greenfield refinery investment. Developed a price forecast and expected product netback prices and crude oil costs. Calculated the cash flow, NPV, and IRR for the project. Evaluated a crude oil railcar loading facility option for the refinery.

- **Jet Fuel Market Study**
  Analyzed historical jet fuel prices in PADD 1 to show how interruptions in supply impact the market price. Prepared a supply and demand balance for jet fuel in PADD 1. Developed a jet fuel supply curve for Gulf Coast and PADD 3 refiners into PADD 1.

- **Light Tight Oil (LTO) Refining Capacity**
  Conducted a study to assess the ability of the United States (U.S.) to absorb incremental light tight oil (LTO) production. Evaluated potential for crude oil import substitution, refinery expansions, heavy oil blending and other means for increasing U.S. absorption of LTO. Results were compared to various forecasts of domestic oil production growth.

- **Terminal Due Diligence**
  Provided technical due diligence support for a large terminal acquisition opportunity involving approximately 50 terminals, 700 tanks, and 30MMbbls of storage.

- **Refinery Evaluation**
  Used PRISM, Baker & O’Brien’s proprietary refining industry analysis tool, to establish relative refinery profitability for Philadelphia refining system. Developed proposal to install instrumentation upgrades and be paid through a percentage of the improved economic value.

- **Refinery Valuation for Ad Valorem Taxes**
  Developed a cost approach estimate for the valuation of process units at a U.S. Gulf Coast Refinery. Calculated a replacement cost new for the process units and adjusted for physical depreciation, functional obsolescence, and economic obsolescence to arrive at a physical asset value for the refinery’s process units.

- **Refinery Valuation: Ad Valorem Tax Support**
  Developed income and cost indications of value for a refinery in an ad valorem tax dispute.

- **Hydrogen Pipeline Construction Cost Dispute**
  Assisted client in a dispute concerning settlement costs in regards to a canceled construction contract for a hydrogen pipeline.

- **FCC NOx Allocation**
  Prepared a report of FCC regenerator nitrogen oxides (NOx) production that allowed allocation of FCC NOx from a combined refinery stack. The report was used to negotiate the allowable corporate average NOx limits with the EPA.

- **Delayed Coker Fire Investigation**
  Assisted client in investigating the cause of a coker hydrocarbon release and fire, which resulted in multiple fatalities. Visited refinery and reviewed procedures and events preceding the incident to identify potential areas of causation and liability. Operating experience and knowledge of technical and safety issues and of industry and management practices helped the client in addressing specific claims issues.
**Sulfuric Acid Storage Incident**
Retained to assist in the investigation of a fatality incident at a sulfuric acid processing and storage facility. Reviewed equipment design, inspection and repair history, operating procedures, training of personnel, and industry practices. Assisted legal team with on-site investigation and interaction with local, state, and federal agencies. Reviewed conclusions by root cause analysis for consistency and factual support.

**Gas Wellhead Equipment Failure**
Performed root cause analysis of a gas well casing hanger which led to a well blow out.

**Review of Facilities Safety Issues**
Assisted in technical review of safety related issues at crude oil production and gathering facilities.

**Cause and Origin Analysis**
Conducted a cause and origin investigation of a fire at a natural gas combined cycle generation plant. Investigation included in-plant interviews and review of operational data, as well as metallurgical investigation to determine the probable cause and origin of the fire.

**Tank Collapse Assessment**
Assessed contractor work practices associated with the collapse of a storage tank that occurred during cleaning operations.

**Crude Marketing Study**
Prepared a crude marketing study for a Utah black wax crude oil producer. Evaluated refineries outside of Utah which could receive crude oil via railcars and the expected netback price to the crude oil producer. Identified and ranked the refineries which would yield the highest netback value to the producer. Provided contact information and initiated meetings with the crude oil producer and potential refinery candidates for processing the Utah black wax crude oil.

**Gas Plant Mediation Support**
Provided mediation support in relation to a helium supply agreement dispute.

**Refinery Environmental Review**
Reviewed and reported on potential environmental solid waste issues associated with a large idled refinery in support of a client's bid for the facilities. Performed an on-site inspection of the refinery to identify potential environmental risks.

**Bankruptcy Reorganization**
Developed, in conjunction with senior management, reorganization plans for various operating segments of a major trading and transport company. The resulting business plan formed the foundation of the company's successful reorganization and emergence from bankruptcy.

**Crude Oil Marketing Study**
Provided support to a major Canadian crude oil pipeline transporter in the customization of the PRISM model, Baker & O'Brien's proprietary refining industry analysis tool, the company had licensed from Baker & O'Brien. Support included addition of crude oils of specific interest to the client.

**Damages from Steam Turbine Failure**
Assisted in determining economic damages resulting from failures associated with a new steam turbine that was provided and installed by a turbine manufacturer at a power generation facility. Conducted independent assessment of economic losses suffered by electric cooperative as a result of both short-term and long-term performance shortfalls and outages.

**LPG Pipeline Contamination**
Evaluated pipeline contamination and potential sources of contaminants from various sources.

**Refinery Performance Test Evaluation**
Investigated claims of poor performance of a $1 billion refinery project between a refiner and a major EPC contractor. Evaluated charge and yield, feedstock quality, and efficiency issues and assisted in documentation of response to claim.

Investigation of Gas Processing Plant Incident
Assisted in the investigation of an explosion and fire with resulting failure of natural gas supply from onshore crude oil, condensate, and natural gas processing facilities located offshore. Reviewed facility design, operating, and maintenance standards and prepared expert testimony.

Refinery Acquisition Assessment
Prepared an initial profitability assessment of two refineries for possible acquisition. Identified key drivers to profitability and the strengths and weaknesses of each refinery.

Crude Oil Storage Support
Surveyed industry sources to develop an estimate of the current crude oil storage costs in the Texas Gulf Coast area. Developed an estimate of the current crude oil storage capacity and petroleum refinery capacity in the Houston area.

Refining Margin Forecast
Provided a ten year refining margin and price forecast for use by client in developing their long-range plan. Provided historical trends and identified drivers that could impact future refining margins.

Refinery Yield Data
Provided refinery yield data and variable operating costs for developing generic refining margins. Refinery yield data sets included generic refineries located in the Midwest, U.S. East Coast, and U.S. Gulf Coast, with varying configurations.

Jet Fuel Underpayment Claim
Assessed jet fuel supply contracts to see if an overpayment claim was justified.

California Crude Oil Study
Developed a detailed California crude oil supply, demand, and transportation balance (by refinery) for a mid-size independent California crude oil producer. Results were used in client's annual report for shareholders and security analysts.

Refinery Design Review
Grassroots refinery was to be a modular-fabrication with an on-site assembly on a greenfield site in North East Africa. Due to the characteristics of the crude oil (heavy, waxy and high naphthenic acid content), process design included Visbreaker-type technology. An evaluation was made of the process design and the project economics.

GTL Technology Assessment
Provided a fatal flaw analysis, evaluated the technology application and integration, reviewed the cost estimate accuracy range, and assessed the financial model for a natural gas to wax proposed project. Particular emphasis was placed on the ability to scale-up the process, the assumptions for plant capacity and availability, and the project schedule.

Refinery Economic Study
Evaluated various strategic options for a small Rockies area refinery, including an evaluation of a new diesel hydrotreater, refinery crude and product slate optimization, operating cost evaluation, and exit strategy and shutdown costs. Refinery was shut down due to the small refinery ULSD exemption that was expiring. Client wanted to evaluate the impact on the competitiveness of the refinery of adding a new diesel hydrotreating unit.

Refined Products Pipeline Market Study
Developed a supply and demand forecast by market area for a major refined products pipeline from the Gulf Coast to the Midwest. Project involved analyzing historical supply trends and demand by market area and forecasting expected pipeline flows under various refinery utilization scenarios.
Pipeline Specifications Dispute
A new pipeline owner was seeking to impose tighter diesel specifications on a pipeline. Provided an expert report and testimony regarding common carrier pipeline diesel product specifications in a regulatory hearing. The dispute was ultimately settled prior to the hearing.

Refinery Acquisition Assessment
Provided initial due diligence for a potential refinery acquisition. Evaluated refinery profitability and strengths and weaknesses. Developed forecast for future refinery profitability.

Pipeline Operating Practices
A lawsuit was filed against a major U.S. pipeline company stating that its operating practices during maintenance at a gas gathering line resulted in a fire and the injury of two contract workers who were the plaintiffs. We were asked to opine on the cause of the fire. The matter was settled out of court prior to reports being issued or testimony being presented.

Crude Oil Quality Bank Study
Recommended a crude oil quality bank methodology for the different types of crude oil to be stored in a new USGC crude oil storage facility. Reviewed other existing quality banks and developed recommendations and methodology for managing a crude oil quality bank.

Refinery Assessment for Acquisition
Developed a cash flow model for valuation of a potential refinery acquisition. Used PRISM data to estimate the refinery yields and operating costs. Evaluated several refineries as part of acquiring the entire refining assets.

Refiner Acquisition Study
Developed cash flow models of a U.S. refiner for a client interested in a potential acquisition. Developed a price forecast and cash flow model for each refinery under consideration. Utilized PRISM and publicly available data to model the charge and yield and economic performance of each refinery. Cash flow models were used for valuation of the potential acquisition.

Refinery Acquisition Study
Developed a cash flow model of a U.S. refinery for a client interested in a potential acquisition. Utilized PRISM and publicly available data to model the charge and yield and economic performance of the refinery. Cash flow model was used for valuation of the potential acquisition.

Canadian Refinery Competitiveness Study
Evaluated the competitive position of several Canadian refineries located in Eastern Canada and Ontario. Evaluated refinery configurations, crude oil slate and product yield, and profitability versus a group of regional competitor refineries. Presented the crude oil and product logistics systems for each of the Canadian refineries being studied.

Oil Company Due Diligence
Retained to visit data room and prepare due diligence report summarizing facilities and environmental information for multiple oil fields and an oil processing and export terminal.

St James Louisiana Crude Supply Study
Analyzed crude supply sources and pipeline flows for the Southern Louisiana refining market in conjunction with a potential pipeline acquisition. Forecasted crude supply availability by grade in the St. James trading hub and analyzed impact of new crude oil pipelines in the market.

California Terminal Due Diligence
Assisted midstream buyer with valuation of a large Northern California petroleum terminal. Delivered market study presentation to company management to assist in due diligence and valuation using market metrics.
Permian Basin Crude Oil Supply and Logistics
Provided supporting material related to Permian Basin crude oil production growth and logistic infrastructure for a pipeline owner’s annual investor presentation.

Refinery Acquisition Screening Study
Developed a refinery acquisition matrix comparing quantitative and qualitative aspects of various refineries. Utilized PRISM data to compare relative profitability and charge and yield results for various refineries under consideration.

RIN Balance Study

Refinery Equipment Evaluation
Evaluate suitability of surplus equipment from a shut down refinery crude unit being sold for rehabilitation and then installation overseas.

Shale Oil Market Study
Developed target markets, estimated values for upgraded shale oil in various U.S. refineries, and expected price netbacks to the project site. Developed crude oil supply and demand balances to determine which crude oils would be displaced and the expected pricing impacts.

Polypropylene Plant Due Diligence Support
Provided technical due diligence support for a moth-balled polypropylene plant. Evaluated capacity, historical utilization and mechanical availability and other factors.

Refinery Valuation Study
Provided an opinion as to the fair market value of a large European refinery that changed ownership during the 1980s. Party filed arbitration proceedings against its former partner, claiming that the refinery was sold for well below market value. Prepared several reports that were submitted as evidence.

Review Project Development Costs
Evaluated multi-million dollar cost overruns of yearly operating budgets of a Central Asian consortium involved with the oil and gas development and production. Costs reviewed included Engineering Support, Operating Costs, Drilling Costs, and Capital Expenditures.

LNG Liquefaction Capital and Operating Costs
On behalf of a confidential client with a proposed world-scale LNG liquefaction plant, prepared high-level cost estimates for two phases of the project: 1) the engineering, procurement, and construction (EPC) phase and, 2) the operating phase. Provided cost data for client’s financial model to help assess the risks and viability of the project.

LNG Due Diligence
On behalf of potential offtakers and equity investors of train one, performed a technical due diligence and risk assessment of a two-train liquefaction project, including common use of certain existing regasification facilities. Work completed during the development phase of the project involved the evaluation of pre-completion risks and post-completion risks, including a review of planned and existing facilities. CAPEX, contractor capabilities, construction schedule duration, and OPEX were reviewed for appropriateness and risk of overrun. Subsequent follow-up work included a review of an Open Book Estimate (OBE), a project risk evaluation (reviewed and quantified pre-FID and post-FID cost and schedule risk), and an assessment of the project’s draft environmental impact statement (EIS).
- **PRISM Refinery Data**
  Provided historical refinery cash flow estimates for use by the client's credit department in assessing counterparty risk.

- **Pacific Northwest Market Study**
  Prepared a market study of the Pacific Northwest U.S., which included the refined products supply and demand balance and logistics systems. The emphasis of the study was on current and future jet fuel supply and demand in the region. Evaluated jet fuel logistic systems for Pacific Northwest.

- **Fuel Contamination Investigation**
  Investigated an occurrence of contaminated diesel fuel at a mine facility, as well as the claimed property damage and business interruption claims. Assessed the root cause of the fuel contamination and prepared a presentation of our findings.

- **Pipeline Pigging Incident Investigation**
  Following a plant incident caused by the ingress of water, we investigated upstream pipeline activities and operating records to determine the root cause of the incident.

- **Terminal Hurricane Damage Repair and Claim**
  Assisted in a dispute concerning a rebuild estimate for a terminal damaged by a hurricane.

- **Power Transmission Fire Investigation**
  Investigated the cause of major fire that resulted in a fatality.

- **Storage Tank Foundation Failure**
  Following the failure of a storage tank foundation, we reviewed the applicable documentation and prepared an affidavit concerning the standard of care used during its construction.

- **Project Feasibility - LNG**
  On behalf of the major oil company project sponsor, prepared a capital cost estimate for a proposed world-scale, “grassroots” liquefaction plant. The cost estimate was used to evaluate competing Front-End Engineering and Design (FEED) technology packages from engineering, procurement, and construction (EPC) contractor/licensors.

- **LNG Due Diligence**
  Provided technical support to the sponsor of a multi-train liquefaction project. The scope of work included: preparation of a technical due diligence report; in-depth review of the Open Book Estimate (OBE), schedule, and project execution plan; assessment of the EPC contractor’s capabilities and experience; high-level review of geotechnical issues; assistance in the development of an Operating and Maintenance (O&M) plan; input into the formation of sponsor’s project management team; and input into the development of owner’s costs, including appropriate levels of cost and schedule contingency. Provided support to the sponsor with EPC contract negotiations.

- **Ammonia Plant Insurance Dispute**
  Assisted in evaluating insurance claims asserted by a major ammonia manufacturer. Work included evaluation of the technical basis for claims involving construction defects and warranty work amounting to $3 million. Assisted in documenting claims, inspected the plant, evaluated project records, and reviewed maintenance records.

- **Fertilizer Complex Economic Model**
  Constructed an economic model to analyze the financial performance of a fertilizer complex that produced ammonia and other nitrogen chemicals. Evaluated expected operations and financial performance subsequent to the completion of an ongoing capital expansion project.

- **Ammonia Plant Project Finance**
  Served as independent engineer on behalf of the financial advisor for the construction of a new small-scale biomass to nitrogen
fertilizers complex. Prepared a technology assessment, analyzed feedstock supply, reviewed contracts, reviewed site and infrastructure considerations, and advised with negotiation of contracts.

- **Refinery Process Unit Damage Dispute**
  Retained to a

- **Light Product Supply and Demand Study**
  For a large m

- **Condensate Splitter Study**
  Prepared a st

- **Condensate Splitter Operating Budget**
  Provided budg

- **Analysis of U.S. Gasoline Prices and Crude Oil Prices**
  Analyzed the

- **Permian Basin Market Study**
  Analyzed Perm

- **Louisiana Crude Oil Supply Study**
  Analyzed crud

- **Splitter Performance Review**
  Provided guid

- **Crude Oil Rail Terminal Study**
  Provided an o

- **Crude Oil Pipeline Dispute**
  Provided expe