Baker & O’Brien consultants are frequently retained as consulting or testifying experts for a wide range of accidents and incidents in the hydrocarbon process industries. These may range from small accidents involving an injury, to serious accidents involving fatalities. We have performed fire and explosion investigations, including those involving oil and gas processing, petrochemicals, the manufacturing of acoustic insulation, automotive paint systems, railcar explosions, and drilling rigs. We have conducted cause and origin investigations and root cause analyses for our clients. As part of our cause and origin investigations, and in support of potential litigation, we have been requested to secure and preserve the incident scene, coordinate the investigations of multiple third parties, including government agencies, and conduct on-site and off-site testing, as required. Our investigation findings have been presented at court proceedings where our expert testimony has been relied upon by judges, juries, and arbitrators.

RELATED INDUSTRIES

- Additional Process Industries
- Gas Processing
- Oil and Gas Production
- Petrochemical / Chemical
- Petroleum Refining
- Power Generation
- Renewable / Alternative Energy
- Transportation and Storage
EXPERT WITNESS AND DISPUTE SUPPORT

Accident/Incident Investigation

PRIMARY CONTACTS

Charles J. Hirst
Senior Vice President
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Consultant
Houston

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Houston

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Consultant
Houston
RELATED EXPERIENCE

- **Chemical Plant Accident Investigation**
  Investigated an accident at a polyethylene production and storage facility. Reviewed equipment design, inspection and repair history, training of personnel, industry practices, and standards of care.

- **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.

- **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.

- **Economic Damages Litigation - Plant Explosion**
  Retained concerning claims of design errors and failures in project management, following explosions and fires at a petrochemical plant. Conducted in-depth reviews of engineering, procurement, and construction agreements; process technology and design basis; construction records; owner’s operating procedures; and actual operating history since start-up of the plant. Evaluated operating system provided against prevailing industry standards and examined potential for equipment failure.

- **Economic Damages Litigation - Plant Fire**
  Following furnace damage and rebuild, provided expert regarding property damage costs and normal maintenance/scheduled turnaround/betterment costs. Similarly, business interruption costs were compiled with reference to market situation and product volumes that were available from inventory.

- **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.

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

- **Expert Consulting Services**
  Provided expert consulting services concerning a personal injury incident that involved a weld failure and a release of hydrocarbons.

- **Litigation - Fuels Terminal Operations Assessment**
  Performed expert advice on fuels terminal operations that focused on the practices and procedures with an emphasis on the filling of product tanks.

- **Gas Well Incident**
  Prepared expert report on behalf of client versus OSHA. Matter involved failure of a pipe carrying natural gas that injured one contractor. OSHA cited client for failure to provided a safe means of pressure relief for vessel (in-line heater) and piping.

- **Gas Wellhead Equipment Failure**
  Performed root cause analysis of a gas well casing hanger which led to a well blow out.
Gasoline Spill Litigation
Assisted in a dispute between a retail marketer and contractor concerning allegations that contractor’s work contributed to a gasoline spill from a retail gas station that contaminated the well water of 130 homes. Assisted in discovery, evaluated the mechanical integrity of equipment, examined unique theories of causation, inspected site, and attended destructive testing procedures.

Incident Analysis - Petrochemicals
Performed an investigation analysis following fire and explosion incidents at a major Gulf Coast manufacturing facility. The engagement entailed development of the sequence of events, root cause analysis, assessment of the decision to rebuild, and reconstruction monitoring. An independent project schedule and cost estimate for the plant reconstruction was developed.

Industrial Incident
Investigated cause of dust cloud deflagration at a Vitamin E production facility. Assessed that bulk solids handling procedures were modified without considering the original safety design basis for the equipment. Developed expert opinions on causation.

Investigate Refinery Heater Explosion
Performed root cause analysis of an explosion at a refinery heater and identified contributing factors. Performed a review of safe operating procedures, including shutdown and start-up of heaters. Provided expert testimony.

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

Marine Cargo Contamination
Investigated causes for contamination of a cargo of gasoline delivered by ship to Ecuador. Work included review of contract requirements, gasoline blending practices, surveyor procedures, and issues related to laboratory testing of gasoline.

Nitroparaffins Litigation
Assisted in a dispute between an operator and an EPC firm concerning allegations that the process design contributed to an explosion at a nitroparaffins manufacturing plant. Assisted in discovery, evaluated design issues, and provided expert testimony.

PVC Plant Litigation
Assisted in a dispute concerning allegations that an explosion at a major manufacturer of PVC resins was due to a poor process design that failed to meet government regulations and engineering standards. Assisted in discovery, inspected the plant, evaluated procedures and work methods, reviewed applicable standards, and reviewed operating records.

Polyurethane Foam Litigation
Assisted in claims concerning polyurethane foam system products that were alleged to be defective or unfit for their intended use. Assisted in discovery, observed and reviewed work environment and work methods, evaluated manufacturing records, reviewed warranty claims, and prepared trial exhibits.

Pulp and Paper Mill Incident
Analyzed processing operations and engineering design in a pulp and paper mill to determine sequence of events and possible causes of incident.

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.

Thermal Radiation Exposure
Investigated an incident involving a claim of thermal radiation exposure during a refining unit fire. Engineering reports, videos, weather conditions, unit design drawings, and published literature on levels of heat exposure from large hydrocarbon fires were evaluated.

**Salt Water Disposal Tank Explosion**
Investigated the cause and origin of a storage tank explosion at an oil and gas salt water disposal facility in Colorado. Conducted site investigation and facility/equipment inspections, evaluated system design and operation, and conducted witness interviews. Determined cause of explosion and worked with company management to evaluate existing policies and procedures for potential areas of improvement.

**Subsea Pipeline Rupture**
Assisted attorneys in investigating the circumstances surrounding a rupture of a subsea crude oil pipeline caused by a vessel dragging an anchor. This assignment included a review of the impact on crude oil gathering system and receiving terminal operations, the owner's emergency response, subsea pipeline repair costs, and a determination of the maximum insurable loss.

**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.

**Reciprocating Compressor Accident**
Reviewed details of a non-fatal accident involving a restart of skid-mounted gas compression machinery at a producing well. Upon investigation of the facts, prepared report detailing the proximate cause of the incident.

**Tank Truck Explosion Investigation**
Investigated the potential causes and sources of ignition for an explosion that destroyed a road tanker, used to haul raw natural gas liquids from a gas treating plant, that was in a repair shop for the replacement of a pressure relief valve.

**Pressure Vessel Failure**
Investigated the cause of a hydrocarbon release resulting from the brittle fracture of a pressure vessel during start-up at a petrochemical plant. Incident involved multiple injuries and deaths and extensive property damage. Issues studied include ethylene plant design, operating practices and procedures, start-up operations, instrumentation, and safety training.

**Polyolefins Plant Explosion**
Assisted attorneys and company in preparation for litigation and negotiation with government agencies while investigating the cause of an explosion which caused the death of over 20 people. Assisted risk management in preparing and negotiating property damage and business interruption claims in excess of $1.3 billion.

**Coal Gasification Plant Accident**
Provided assistance to a mechanical contractor for a root-cause investigation of a fatal accident at a coal gasification plant.

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

**Petrochemical Terminal Fire**
Reviewed testimony, expert reports, and forensic evidence and attended depositions to determine cause and origin of terminal fire. Prepared report addressing electrostatic discharge theory, petrochemical handling procedures, employee training, and management issues.

**Fall Protection Evaluation**
Investigated circumstances concerning the injury to a person who fell from a loading dock. Provided opinions regarding general
safety requirements, industry practices, and fall protection requirements for this type of activity.

- **Failure Analysis of Pressure Washer**  
  Evaluated the cause of a failed hot water pressure washer used during a road construction project.

- **Pipeline Pigging Accident**  
  Reviewed injury accident that occurred while pigging a gathering pipeline to remove formation water produced with natural gas.  
  Provided an expert report regarding applicable industry standards regarding operation of vacuum truck for disposal of formation, as well as observations regarding the contractual responsibilities of the tank truck operator and the production operator.

- **Dust Explosion Capability Testing**  
  Provided assistance in testing of explosiveness of resin dust during the operation of hand tools in a confined space.  Dust test results were videotaped and used for litigation support.

- **Tube Sheet, Flare Tip Matter**  
  Investigated the cause of tubesheet and flare tip damage related to an unplanned sudden shutdown of the facility.  Evaluated whether damage was caused by the shutdown, long-term wear, or contractor error during installation.  Provided expert support through mediation and settlement efforts.

- **Gas Treating Facility Explosion Investigation**  
  Investigated cause of system overpressure and shutdown of downstream pipelines which led to flange gasket failure and fire.  
  Reviewed system design, construction, and overpressure protection at wellheads located upstream to determine cause of failure.

- **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.

- **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.

- **Horizontal Drilling Property Damage**  
  Reviewed damage to private property (farmland) allegedly caused during the installation of an underground pipeline.  A portion of the pipeline was installed using the technique of horizontal directional drilling (HDD).

- **Turbine Fire**  
  Performed review of root cause analysis of the failure of a 125 MW generating steam turbine.

- **Marine Accident Investigation**  
  Investigated causes for contamination of a cargo of residual fuel aboard a barge that exploded and sank.

- **Product Terminal and Transmix Processing Valuation**  
  Physical asset appraisal and business valuation of a refined product terminal and transmix processing facility.  Estimated the replacement cost and deferred replacement value of the physical assets to provide a depreciation basis for taxes.  Valued the business enterprise using a discounted cash flow approach based on an analysis and projection of transmix processing and product terminal activities.

- **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.
Independent Engineer for New Refinery in Egypt
Technical due diligence for financing of a 200,000 B/D merchant export refinery in Egypt. Our review included opinions on site selection, owner's development plan, supply agreements, offtake agreements, EPC Contracts, refinery unit technologies including sulfur recovery, 'over-the-fence' utility interface, crude oil supply and product export terminal facilities. Our review also included opinions on environmental compliance, licenses and permits, CAPEX, construction schedule, completion risk, OPEX and technical comment to the financial model.

Alaska Refinery Evaluation
Assisted our client in evaluating the profitability of one of the refineries in Alaska. The evaluation provided inputs that were instrumental to the client in its ongoing discussions with a refiner regarding a long-term crude oil supply contract.

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 Valuation Dispute and Arbitration
Developed an opinion of the value of a joint venture company that owned and operated a large petroleum refinery in Eastern Europe. Evaluated the refinery's financial performance, capabilities and competitive position, as well as other valuation metrics, such as replacement cost and comparable refinery transactions. Provided testimony at international arbitration.

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

Refinery Risk Assessment
Assessed the technical and commercial risks inherent in each of several refineries owned by a U.S. refining company.

Product Pipeline Terminal Valuation
Prepared a terminal valuation based on a discounted cash flow analysis of transmix and terminal businesses and an appraisal of the physical assets.

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.

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.

Owner's Engineer for New Refinery Project
Reviewed key project assumptions and provided guidance on various aspects of project development, including: transportation infrastructure; refinery design basis; EPC strategy and contract; refined product markets and pricing basis; crude oil sources, quality, and pricing assumptions; project financial model and economics.

Wyoming Refinery Appraisal
Fair market appraisal of a refinery including connecting crude and products pipelines and storage assets to support debt financing. Project included income valuation with forecast prices, discounted cash flows, and replacement cost estimates for the refinery as well as the pipeline and storage assets.

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

Residual Fuel Oil Valuation
Provided an assessment of the quantity, quality, and value of fuel oil recovered during demolition of storage tanks at a power plant.

Drilling Incident Investigation
Following an incident on an oil drilling platform, assisted with the investigation to discern whether relevant practices, e.g., API and others, were followed.

Refinery Fire Insurance Claim
Assisted in a dispute concerning a rebuild estimate, which was the subject of subrogation, for an oil refinery process plant damaged by fire.

Nitrogen Manifold Failure
Provided litigation support for nitrogen manifold explosion.

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

Ethanol Plant Freeze Claim
Reviewed an insurance claim associated with an idled ethanol manufacturing facility being re-started. Purpose was to assess items listed in the claim to determine if damages were caused directly by a winter freeze or due to some other failure mechanism such as improper mothballing techniques or normal degradation of a once-operating facility.

Refinery Turnaround Dispute Arbitration
Investigated the cause/origin of a leak that developed on a process unit after a turnaround, leading to an extended shutdown. Evaluated various damage models used to estimate the value of loss of use of the process unit and the reduced operation of the refinery. Submitted an expert report on the leak liability issues and the estimated value of loss of use of the process unit and its effects on refinery operations.

Debutanizer Tower, H2S Incident
Developed an expert witness report associated with an incident concerning an H2S release during the scheduled turnaround activities involving a debutanizer tower.

Power Plant Cooling Tower Operation
Assisted in a dispute concerning whether or not the alleged excessive vibration observed in an operational cooling tower was outside the limits of operational integrity called for in the operating insurance policy.

Barge Loading Incident Investigation
Investigated a marine over pressure and rupture incident which occurred while loading a barge with light stabilized hydrocarbons.

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.

Post-incident Equipment Preservation Review
Assisted client by assessing preservation techniques and “mothballing” efforts following the catastrophic failure of a vessel at a specialty products company. Incident resulted in an insurance claim for damaged equipment and idled equipment in the vicinity of the vessel failure. Efforts included assessing preservation techniques utilized at the plant compared to industry practices, developing an expert report, and providing expert testimony.
EXPERT WITNESS AND DISPUTE SUPPORT

Accident/Incident Investigation

- **Paper Mill Safety Incident**
  Assisted attorneys by investigating the circumstances concerning an incident that occurred at a paper plant during a scheduled turnaround that resulted in a fatality. Issues studied included assessing work practices and safety procedures utilized to prepare equipment for turnaround activities, including vessel entry and paper mill plant design.

- **Refinery Business Interruption Dispute**
  Following an unplanned shutdown, caused by extensive equipment damage, evaluated the refinery operation to confirm that all mitigation steps had been taken and also confirm the claimed business interruption losses.

- **Power Outage Cause and Origin**
  A refinery suffered an unplanned shutdown due to a power outage. At the time of the incident, the power source was from the grid via a third-party cogeneration station. Analyzed facilities and procedures to determine which parties: the grid, the cogeneration station, and/or the refinery, contributed to the outage.

- **Fracking Equipment Fire**
  Assisted with the Cause and Origin investigation of a fire on a blender used in a fracking operation.

- **Marine Dock Business Interruption Claim**
  Reviewed documents and provided analysis concerning a marine collision with the crude oil unloading dock, which resulted in a business interruption claim for a Gulf Coast refiner.

- **Standard of Care During Ethylene Plant Outage**
  Reviewed the shutdown and subsequent start-up of an ethylene plant following a utility outage. Reviewed liquidated damage calculations.

- **Pipeline Pig Station Incident Investigation**
  Reviewed information concerning a fire associated with the commissioning of a pipeline station and equipment skid. Purpose was to assess cause and origin for the incident and roles and responsibilities of the operating company and equipment supplier associated with the project.

- **Refinery Flare Incident**
  Following a fire during a scheduled flare system maintenance turnaround, retained to assess the feasibility of safely hot tapping the flare header to install a stopple and allow removal of a large gate valve upstream of a flare knock-out drum. In consultation with other parties, assessed: (1) the flare system equipment, (2) the refinery hot tap procedures, and (3) evaluated if the activities could be performed safely.

- **Accident Liability**
  Assisted in a personal injury claim following an incident in a petroleum refinery process unit. Examined refinery conformity with the latest available industry technology, regulations, standards, and practices.