LONG INTERNATIONAL

RICHARD J. LONG, P.E., P.ENG.

Richard J. Long, P.E., P.Eng., is Founder of Long International, a Colorado-based construction claims and project management consulting firm that focuses its practice on owners, engineering and construction firms, and contractors performing petroleum refining, petrochemical, oil and gas, LNG, power/cogeneration, mineral processing, industrial, building, and infrastructure projects worldwide. Mr. Long has over 50 years of U.S. and international consulting experience involving construction contract disputes analysis and resolution, arbitration/litigation support and expert testimony, project management, engineering/construction management, cost and schedule control, and process engineering. As an internationally recognized expert in the analysis and resolution of complex construction disputes for over 35 years, Mr. Long has served as the lead expert on over 300 projects having claims ranging in size from US$100,000 to over US$2 billion. He has testified in mediation, deposition, and court as well as U.S. and international arbitration. His expert consulting experience includes refineries, petrochemical and chemical plants, LNG projects, offshore oil and gas facilities, power plants, oil sands and oil shale facilities, metallurgical projects, and commercial and industrial buildings. He has presented and published numerous articles on claims analysis, entitlement issues, CPM schedule and damages analyses, cumulative impact claims, and claims prevention.

Before forming Long International, Mr. Long was Senior Vice President, Contract Administration for a major electrical and mechanical contractor. In this role, he had corporate-wide responsibility for technical management and oversight of the preparation and resolution of construction claims. In addition, he was responsible for the development, training, and implementation of project management policies and procedures to ensure that profit, cost, schedule, scope, quality, and safety objectives were achieved.

For 13 years, Mr. Long managed the construction claims practices of two large consulting firms. Prior to his consulting career, Mr. Long gained 13 years of project management and process engineering experience on petroleum refining, oil shale, synfuels, mining, and power generation projects with Tosco, Fluor, and Conoco.

EDUCATION

M.S., Chemical and Petroleum Refining Engineering, Colorado School of Mines, 1974
B.S., Chemical Engineering, University of Pittsburgh, 1970

PROFESSIONAL REGISTRATIONS

Registered Professional Engineer, Colorado (No. 25050)
Licensed Professional Engineer, Newfoundland and Labrador (No. 09209)

PROFESSIONAL AFFILIATIONS

American Institute of Chemical Engineers
Project Management Institute
AACE International
Society of Construction Law

TEACHING AND SEMINARS

Seminar Leader providing in-house Claims Prevention Training Seminars to owners and contractors, 1996–Present
Instructor, University of Houston, Master of Engineering, "Claims Management," 2003.
Honorarium Instructor, University of Colorado at Denver, Masters of Engineering and Engineering Management, "Project Controls and Scheduling," 2001

TECHNICAL EXPERIENCE

Representative U.S. and international technical experience includes:

- Construction claims preparation, analysis, and defense, and negotiation of settlements
- Development of project management plans and procedures
- Management of petroleum refining, oil shale, synfuels, mining, and power generation projects, including program and project management and the management of major engineering and construction contractors as the owner's representative
- Identification and systematic evaluation of major engineering and construction problems and their cause/effect relationship on cost and schedule overruns
- Project management performance assessments
- Deposition and expert witness testimony
- Development of numerous computerized database management systems
- CPM schedule analyses of the impacts of delays, disruption, acceleration, and loss of labor productivity
- Contract/entitlement analysis
- Direct and indirect damages assessments
- Process engineering, process flow diagrams (PFDs), piping & instrumentation diagram (P&ID) development, and preparation of equipment specifications
- Speaker and author of numerous articles and training manuals on construction claims, project cost and schedule control, change order management, schedule delay analysis, damages calculation methodology, and project management

PROJECT EXPERIENCE

As an internationally recognized expert in the analysis and resolution of complex construction disputes, Mr. Long has evaluated claims and assessed the performance of owners, engineers, and contractors on numerous types of projects both in the U.S. and internationally. Representative projects include the following:

Oil Refinery, Petrochemical and Chemical Plants, LNG, and Offshore Oil and Gas Production Facilities

- On behalf of the owner, provided oversight to the analysis of technical issues regarding mechanical completion and entitlement to requested change orders on a multibillion-dollar oil refinery in Southeast Asia. Reviewed expert reports and reply reports and assisted Long International expert in preparation for testimony in arbitration.
- On behalf of the owner, provided oversight to the technical analysis of engineering issues and change order issues that delayed the start of construction work on pipelines and gas gathering facilities on an

LNG project in Australia. Reviewed expert reports and reply reports and assisted Long International expert in preparation for testimony in arbitration.

- Tribunal Appointed Schedule Delay Expert for an ICC arbitration case involving a delay, mismanagement, and lost-profits claims regarding the construction of a large oil refinery in Europe. The owner sought recovery of claims in excess of €100 million from the EPCm contractor based on allegations of gross negligence. Testified in London.
- On behalf of the owner, performed an assessment of the EPCm contractor's cost, schedule, technical, and project management performance on a multibillion-dollar LNG project in Australia that experienced billions of dollars in cost overruns and many years of delay. Provided technical guidance to the owner as to the viability of its potential claims against the contractor for overruns in owner's costs as well as cost overruns incurred by the implementation contractors.
- On behalf of the owner, analyzed approximately 50 change order claims totaling over US$230 million submitted by a Japanese EPC contractor to recover delay, disruption, and increased direct costs and an extension of time on a new petrochemical plant complex in Trinidad.
- On behalf of the owner, sought to recover delay and disruption costs paid to an EPC contractor on a reimbursable EPCm contract on a mineral processing plant in Canada. Prepared an expert report and testified in arbitration regarding the contractor's compliance with industry practices in the preparation and updating of the project baseline CPM schedule and schedule updates. Also prepared a windows-based schedule delay analysis using a time impact methodology for determination of the contractor's entitlement to a time extension and an as-built but-for delay analysis to determine the contractor's entitlement to retain the time-related costs that were paid to it by the owner. Prepared an expert report and provided expert testimony in arbitration.
- On behalf of the owner, provided analyses and prepared expert reports on defense of claims and viability of counterclaims to recover delay and disruption costs paid to an EPC contractor on a more than US$40 billion LNG plant in Australia. Each parties' alleged damages exceeded US$2 billion. Provided oversight to the Long International Schedule Management and Delay Team, Project Management Team, Cost and Schedule Risk Assessment Team, and several Quantum Teams. Analyses included: (1) critique of the contractor's compliance with industry practices in the preparation and updating of the project baseline CPM schedule and schedule updates; (2) preparation of a windows-based schedule delay analysis to quantify delays on the critical and near-critical paths; (3) assessment of delay, disruption, and project management performance issues alleged against the EPC contractor; 4) analyses and quantification of delay and disruption increased costs alleged by the subcontractors in the construction of the facility; (5) assessment of the contractor's expert's quantification of costs incurred at the module fabrication yards; (6) assessment of the contractor's expert's quantification of its management personnel costs during the delay period; and (7) assessment of costs derived from a schedule and cost Monte Carlo risk analysis for which the EPC contractor sought to recover overhead and profit.
- On behalf of the owner, sought to recover delay and disruption costs paid to an EPC contractor under a reimbursable contract on a greenfield and brownfield refinery project in Colombia, South America. Oversaw project team who: (1) critiqued the contractor's compliance with industry practices in the preparation and updating of the project baseline CPM schedule and schedule updates; (2) prepared a windows-based schedule delay analysis of the EPC schedule and the Pre-commissioning, Commissioning, and Start-up Schedule for the project using a time impact methodology for determination of the contractor's entitlement to a time extension and an as-built but-for delay analysis to determine the contractor's entitlement to retain the time-related costs that the owner paid to it; (3) assessed project management performance issues that caused delay and disruption to the project; and (4) quantified the owner's entitlement to recover delay and disruption costs that it paid to the contractor and then sought recovery of those costs from the contractor in arbitration.

- On behalf of an LNG process technology supplier on a multi-train LNG project in the United States, performed an assessment of over US$150 million in delay and disruption claims that were submitted by the Japanese EPC contractor.
- Analyzed an engineering and construction contractor's $154 million change order, delay, and disruption claim against the owner of PET chemical plants in Spain, Argentina, and the Netherlands. The scope of work also included deposition support, assessment of the contractor's allegations regarding the cumulative impact of changes, assessment of PFDs, P&IDs, and isometric drawings for changes, the tracking of the genesis of change orders, field change requests, and lessons learned items from prior projects, a detailed CPM schedule analysis to determine delay and acceleration responsibility, and the quantification of damages.
- Prepared a mechanical contractor's $20 million claim for delay, additional work, labor disputes, and loss of productivity regarding a delayed coker project at the Cerro Negro Oil Upgrading Project in Venezuela. Assisted counsel in the preparation of its briefs, document discovery requests, and provided support in preparation for expert witness testimony at the ICC arbitration hearings in Geneva, Switzerland.
- Analyzed change order and delay claims totaling $85 million submitted by a South Korean EPC contractor on the construction of an offshore production facility that was fabricated in Texas and South Korea.
- On behalf of the owner, performed an analysis and prepared an expert report regarding schedule delays and increased costs associated with an EPC contractor's $138 million claim on a gas plant project in Saudi Arabia. The work involved correction of the contractor's baseline and schedule updates, assessment of impacts allegedly due to change orders, welding defects, late drawing deliveries by the owner, and contractor performance problems. Prepared a time impact and an as-built but-for schedule analysis to address time extension entitlement, compensable delay, and loss of productivity. Developed a chronological database and assisted the law firm with witness statements and document disclosure requests. Completed a comparative assessment between the project's radiography records for the rejected pipe joint welds, and the results that were developed from the owner's radiography expert's interpretation of the films. Evaluated the opposing experts' schedule delay and damages analyses and assessment of responsibilities for project management performance problems. The dispute was resolved prior to arbitration.
- On behalf of the owner, performed an analysis of a Canadian contractor's $25 million delay and disruption claim against the owner of a refinery in Trinidad. The venue was international arbitration under UNCITRAL arbitration rules. The contractor's scope of work involved the construction of a new visbreaker unit, modernization of instrumentation facilities, and a revamp of a fluid catalytic cracker oil upgrading process unit. This project involved the organization of thousands of documents and assessments of alleged delays and disruption impacts identified in change orders, correspondence, meeting minutes, disruption notices, monthly progress reports, and CPM updates. The scope of work also included a detailed CPM schedule delay analysis and the quantification of damages. Prepared an expert report in international arbitration prior to settlement of the dispute.
- On behalf of the owner, performed an analysis of the quantum aspects of a contractor's $130 million delay and changed conditions claim involving the relocation of a $700 million natural gas processing plant project site in Algeria after construction had commenced because of the discovery of unfavorable soil conditions. The owner counterclaimed delay damages because the plant was completed late. Issues involved alleged increased quantities for earthworks and pipelines in the new site location, subcontract labor man-hours and costs, engineering and construction management man-hours and costs, and associated delay, productivity loss, and other costs, and whether the contractor has sufficient documentation to support its claims. The owner alleged bid error by the contractor and inadequate and incorrect quantum calculations to support its claimed costs. Supported the preparation of an expert report and rebuttal expert report, which were submitted in ICC arbitration in Paris, France. The owner received a favorable award.

- Performed an analysis of the technical entitlement of over 400 change orders associated with an engineering and construction contractor's $60 million claim on a magnesium oxide production plant. Determined the cause-effect relationship between the changed work and the resulting schedule impact and additional costs. Provided expert testimony at an ICC arbitration hearing in London. Contractor alleged that the FIDIC-based contract provided relief under the variations clause. The owner argued that it was a fixed price contract and no relief was available. Also analyzed the cause-effect relationship of improper operation by the owner and resulting poor magnesium oxide production from the facility.
- Analyzed a contractor's claim for delay and disruption allegedly resulting from work associated with removal of lead-containing paint from the process plant modules and platforms of an offshore oil production facility installed in the Gulf of Mexico. Testified in mediation leading to a successful settlement of the dispute. This project also involved the defense against the owner's delay claim for recovery of lost profits due to the delay to the achievement of first oil allegedly caused by the lead abatement program. Performed a detailed schedule delay analysis of the contractor's performance on all aspects of the project to demonstrate that concurrent delays by the contractor would have caused delay to the mechanical completion of the spar and the achievement of first oil to be late regardless of the lead abatement program. Presented an expert report and testified in deposition that resulted in a successful settlement of the dispute.
- On behalf of the owner, performed an analysis of a $100 million cost overrun claim resulting from mismanagement, delays, and rework by an EPC contractor for an offshore oil and gas production spar installed in the Gulf of Mexico. The fabrication of the soft tank/truss was performed in Texas and the fabrication of the hard tank was performed in Finland.
- Analyzed an owner's $19 million claim against a major engineering and construction firm relative to home office and field cost overruns on a $200 million refinery project in Illinois.
- Performed an analysis of a major international contractor's $22 million delay and disruption claim on a $100 million refinery upgrade project involving new hydrotreater and sulfur recovery units in Trinidad. Prepared a detailed schedule delay analysis, damage analysis, and provided mediation testimony, which resulted in a successful settlement of the dispute.
- Assessed a Korean contractor's $75 million delay and acceleration claim on an oil terminal project in Russia. Assessed the contractor's CPM schedules, change orders, increased staffing claims, and the owner's counterclaims.
- On behalf of the owner, analyzed schedule delay claims by the prime contractor on an LNG facility being constructed in Angola.
- Provided claims preparation, database development and negotiation support related to the design and construction of a $450 million fertilizer plant in Iraq. During this project, successfully negotiated claims among the Japanese prime contractor and one Turkish and two Korean subcontractors.
- Analyzed delays, productivity loss, and project management performance deficiencies of an LNG terminal project being constructed in Spain for installation off the coast of Italy.
- Analyzed delays to the start-up and commissioning of an upgrader refinery that was built to process synthetic crude oil from an oil sands production facility in Canada. The delays were allegedly caused by a fire at the oil sands production mine site, which delayed the transport of bitumen to the refinery.
- Analyzed change order, delay, and disruption claims involving an ultra-low-sulfur diesel unicracker project at a refinery in Texas.
- Performed a claims analysis, entitlement analysis, schedule analysis, and damages assessment of $20 million in cost overruns on a lump sum, fast-track gas processing plant project in California.

- On behalf of the insurer representing the contractor, prepared an expert report and provided testimony regarding the analysis of an owner's property damage claim following a fire at a condensate storage facility in Louisiana, which damaged the tank areas, including associated equipment, piping, electrical and instrumentation. Also evaluated the validity of the owner's warranty claims that existed prior to the fire and included in the owner's alleged damages. Prepared an expert report and testified in deposition, which led to a settlement of the dispute.
- On behalf of the owner, performed an analysis of a contractor's delay and loss of productivity claim on the design and construction of a polypropylene project in Argentina.
- Performed an analysis of alleged deficiencies in the design of a petroleum coke gasification and syngas plant resulting in change orders, delay, and loss of productivity claims totaling $25 million against the owner of a refinery in Kansas. The project involved the relocation of a coal gasification facility from California and redesign of the plant based on petroleum coke feed.
- Analyzed a Japanese contractor's $35 million change order, delay, and loss of productivity claims on an LPG FPSO project being constructed in Japan for installation in West Africa.
- Performed an analysis of various contractors' delay and change order claims on behalf of the owner on a major gasoline optimization project in Trinidad, including modifications to an existing FCCU unit, a new alky-acid unit, an isomerization unit, a new heavy naphtha hydrotreater and continuous catalytic regeneration platformer unit, and offsite facilities modifications. Claim evaluations included an assessment of the integrity of the contractor's baseline and schedule updates, preparation of alternative impact analysis of delays allegedly caused by scope changes as well as concurrent delays caused by the contractor. Reviewed cost support for the requested change order amounts, recalculated time-related costs based on delay analyses, determined damages based on an assessment of contractual entitlements under the terms of the contract, and participated during negotiations to achieve settlement of the change order claims.
- Performed claims analysis in support of the owner's defense against a contractor's $5 million delay and disruption claim on a fast-track CO_2 recovery process plant facility in Texas.
- Prepared an owner's claim against an engineering and construction management firm who defaulted for defective design, delays, and cost overruns on a guaranteed maximum price contract to build a commercial-scale chemical plant in Colorado that was scaled-up from a pilot plant facility. Process engineering experience was vital in the preparation of analysis and opinion as to the cause-effect relationships of design and procurement problems, delays, and cost overruns on the project.
- Developed cash flow economic evaluation computer models and prepared capital and operating cost estimates and economic analyses used in the negotiation of the $1.1 billion project loan guarantee for the Colony Shale Oil Project in Colorado.
- Performed claims analysis and delay evaluations on a major refinery expansion project in California involving $20 million of direct and indirect damages.
- On behalf of the owner, performed an analysis of an EPC contractor's $43 million claim involving hundreds of alleged P&ID changes to the FEED design of a compressor station and pipeline project in Nigeria, and resulting delay to the completion of the project. Analyzed the technical entitlement to the P&ID changes based on standard industry practice for design development, the owner's specifications, and the timing of the changes.
- Analyzed a $500 million claim for property damage and business interruption costs resulting from fire damage to a petrochemical plant in Texas.
- On behalf of the contractor, evaluated defective design and project management performance problems associated with an offshore underwater gas extraction facility and offshore pipelines, and an onshore gas processing plant in Australia. The contractor was a joint venture of the design firm and the underwater

pipeline installation company. Pursuant to the LSTK contract, the contractor was responsible for carrying out the design, engineering, procurement, construction, and commissioning of the project. The owner terminated the contractor and sought recovery of damages.

- On behalf of the owner, performed an analysis of a $85 million change order and delay claim regarding an offshore Compliant Piled Tower constructed in Texas and topsides facilities fabricated in South Korea for installation offshore Angola.
- On behalf of the owner, evaluated a contractor's $87 million delay and disruption/loss of productivity claim resulting from alleged design changes to a semi-submersible hull and mooring system project, which was fabricated in Norway and installed in the Gulf of Mexico. Evaluated contractor's entitlement to unresolved change orders and contractor's alleged delays associated with owner interference, late owner approvals, ABS approval delays, and out of sequence work.
- Analyzed an EPC contractor's change order, delay, and loss of productivity claims on a Linear Alpha Olefin Project in Alberta, Canada.
- Analyzed and provided mediation testimony in support of an owner's defense of a $10.5 million claim on upgrades to piping and flare facilities in a major international oil refinery.
- Reviewed owner's ITB packages, contracts, project controls procedures, and contract administration procedures for natural gas pipelines and compressor station projects in Trinidad and presented a Claims Prevention Seminar.
- Reviewed owner's contracting strategy and risks associated with the engineering, procurement, and construction of several major chemical plant projects in Texas.
- On behalf of the owner, analyzed delay and disruption claims by a U.S./Argentinean joint venture firm against a major U.S. chemical company on the engineering, procurement, and construction of an ethylene cracker project in Argentina.
- Evaluated a claim by the operator of a chemical storage facility associated with delays and cost overruns caused by scope changes and hurricane impacts. Operator alleged that the cost of the facility significantly increased as a result of owner-caused changes and impacts from Hurricanes Katrina and Rita, and that the owner agreed to compensate the operator for the hurricane impacts. The owner alleged that the operator mismanaged the project, and that the delays and cost increases were primarily caused by other problems not related to the hurricanes.
- Analyzed a major international chemical company's contract documents and specification for engineering, procurement, and construction of chemical plants worldwide. Recommended clauses to resolve potential inconsistencies, ambiguities, and conflicts. Prepared clauses for cost and schedule control procedures. Provided a Claims Prevention Seminar.
- Analyzed a $100 million claim for property damage and $1 billion in business interruption losses resulting from fire damage to an oil sands oil upgrader project in Canada. Prepared assessment of fire-related damages as well as a detailed CPM schedule analysis to determine responsibility for the extended period of time required to reconstruct the facility.
- On behalf of the owner, evaluated outstanding contractual payments, unresolved change orders, and delay costs alleged by a contractor for the fabrication, transportation, and installation of pipeline end terminations and jumpers for an offshore oil production facility in the Gulf of Mexico.
- On behalf of the owner, performed an analysis of the EPC contractor's schedules for a multibillion-dollar gas-to-liquids facility in Nigeria. Verified the schedule work scope against contract requirements. Evaluated schedule metrics, reviewed schedule logic, assessed the reasonableness of the critical path and provided recommendations for schedule optimization. Also evaluated a cumulative impact claim.

- Analyzed a $7 million marine lien claim filed by a mechanical subcontractor against a major oil company on an offshore oil production project in Nigeria. The claim involved the value of equipment, piping, and structural installations on two refurbished drilling rigs that were delayed and impacted by changes and management problems.
- Analyzed delay and acceleration impacts incurred by a U.S. engineering and construction company on an offshore oil production facility in West Africa involving liquidated damages totaling $40 million.
- Assessed a contractor's claim on behalf of the owner for change orders, delays, and acceleration regarding the design and refurbishment of a tanker for a deep-sea crude oil FPSO project to be installed in Brazil. Assessed the reasonableness of the contractor's baseline and updated schedules, and determined potential delays caused by delivery of design information from other components of the project. Evaluated the contractor's claims regarding loss of productivity for the refurbishment work in Dubai.
- Analyzed a $12 million delay and disruption claim on the construction of a chemical plant in Louisiana.
- Analyzed an owner's claim for delays and cost overruns against the engineering, procurement, and construction contractor of a polyol chemical plant project in Tennessee.
- Analyzed delay and acceleration claims on the engineering, procurement, and construction of an ethylene project in Trinidad.
- On behalf of the EPC contractor, performed an analysis of delays and time extension entitlement on a $75 million claim by the mechanical subcontractor involving the procurement materials and installation of process plant equipment and piping on a major petrochemical plant in Texas.
- Performed an analysis of delay and acceleration claims on the engineering, procurement, and construction of an ammonia plant project in Trinidad.
- Analyzed expediting costs incurred by the owner to expedite the completion of the reconstruction of part of an oil refinery in Canada following a fire. This work was performed in support of the insurance company's interest on a property damage claim filed by the refinery owner. The analysis included an assessment of expediting costs associated with procurement of equipment and materials, overtime costs for working multiple shifts and longer hours, and loss of productivity as a result of a compressed schedule, trade stacking, and overtime. Analyzed the trade-offs of increased time-related costs that would have been incurred had the work not been expedited compared to the increased costs as a result of a fast-track schedule. The results of the various scenarios were evaluated using Monte Carlo calculations to derive a probabilistic determination of the range of costs as a function of the variables involved in the analyses.
- On behalf of the owner, performed an analysis of a contractor's $11 million claim involving disputed change order work, loss of productivity, late materials deliveries, and other delay events on a new petrochemical plant project in Angola. Issues involved customs clearance delays and inadequate project management by the contractor.
- Analyzed delay and disruption claims on the engineering, procurement, and construction of an ethylene cracker project in the Netherlands.
- Reviewed a Swedish subcontractor's claim for delay and loss of productivity associated with the fabrication and assembly of living quarters for an offshore oil production facility in the Gulf of Mexico.
- Analyzed delay and performance problems on a gas compressor/pipeline project in India resulting in liquidated damages in excess of $50 million.
- Analyzed owner's damages resulting from the delayed installation of an oil production facility in the Gulf of Mexico due to defects in the fabrication of shackles. Identified the owner's direct costs and time-related costs from its job cost project files. Analyzed the owner's Project CPM schedules to identify critical path delays associated with the work to replace the defective shackles.

- Performed an analysis of a $45 million delay and disruption claim by a South African contractor involving the engineering, fabrication, and erection of two oil production facilities for a major U.S. oil company. Work included an independent assessment of estimated and incurred costs, a schedule analysis of alleged construction and transportation delays, entitlement analysis, and the preparation of affirmative claims against the contractor. Advised the client on the merits of the contractor's claim to facilitate settlement.
- Analyzed a European/Japanese EPC firm's $75 million claims on a refinery upgrade project in Belgium. Assessed the technical entitlement of over 100 change orders forming the basis of the claims as well as the schedule analysis to demonstrate entitlement to an extension of time and delay damages. Evaluated the contractor's methodology for performing its schedule delay analysis and quantum calculations, and its loss of productivity analysis for proof of damages for labor cost overruns.
- Analyzed issues regarding knowledge of delays and cost overruns associated with the issuance of an insurance policy on a refinery project in Canada.
- Reviewed contracting strategy and risks associated with the engineering, procurement, and construction of several major chemical plant projects in Texas for a major international chemical company.
- Retained by a major U.S. oil company to evaluate the status, record keeping, schedules, and costs relative to the design and construction of hulls and topsides for two oil and gas processing offshore platforms being constructed in Korea. The evaluation followed a visit to the contractor's fabrication yard and focused on the analysis of cost overruns, schedule delays, and entitlement, and an assessment of the potential for claims from the prime contractor.
- Evaluated a $15 million claim for impact and delay costs on an ethylene plant in Venezuela.
- Prepared an expert report regarding the potential impact on the surrounding area caused by the construction and operation of a compressor station project in Colorado.
- Reviewed the owner's contract for the engineering, procurement, and construction of a chemical plant in South Carolina. Recommended changes to project management, scheduling, and project controls provisions to improve the owner's visibility into the progress reporting on the project. Provided a Claims Prevention Seminar.
- Analyzed a $1.7 million claim for schedule delays and disruptions during the construction of two wastewater treatment plants and barometric condenser conversions at an oil-processing unit in Trinidad. Prepared detailed CPM schedule analyses and expert reports. The dispute was successfully resolved prior to arbitration.
- Analyzed a contractor's change order claims on an oil sands oil-upgrading project in Canada.
- Reviewed an owner's ITB package for preparation of the FEED for the design of the topsides facilities for an offshore oil and gas production facility in the Gulf of Mexico.
- Analyzed and testified regarding a major oil company's claim against a contractor for $29 million in improper charges on a reimbursable contract for the fabrication in Louisiana and Venezuela of one offshore gas compression platform and two wellhead platforms.
- Analyzed a French contractor's $14 million delay and increased quantities claim on a 36-inch gas pipeline and valve station project in Trinidad.
- Analyzed contractual responsibilities for cost overruns and delays on the fabrication of components of a semi-submersible offshore drilling rig in Texas.

Nuclear, Coal, Geothermal, Biomass, and Gas-Fueled Power Plants

- Analyzed a contractor's $24 million delay and loss of productivity claim involving the relocation of a gas turbine generator and the construction of a new heat recovery steam generator as components of a cogeneration power and steam generation facility in an existing fertilizer plant in Alaska. This project involved litigation support, discovery, deposition support, and the preparation of an Internet-based document database for the retrieval of documentation to support the analysis of the contractor's allegations regarding the delay and impact analysis components of its claim. Successfully critiqued the contractor's claim resulting in a settlement during mediation.
- Prepared a contractor's $45 million delay, change order, and loss of productivity claim involving the construction of three gas turbine power generators and related utilities comprising a new power plant project in Texas. This project involved the preparation of an Internet-based database for the retrieval of documentation to support the delay and impact analysis components of the claim.
- Analyzed an EPC contractor's $40 million claim regarding a lump-sum contract to design and build a gas-fired power plant in Illinois. Assessed the EPC contractor's allegations regarding the constructability of the heat recovery steam generators and the delay and disruption impact of those problems on its work.
- Analyzed an EPC contractor's $30 million delay and disruption claim involving a geothermal power plant project in Indonesia.
- Reviewed an owner's contract for the engineering, procurement, and construction of a polyethylene plant in the Netherlands. Recommended changes to project management, scheduling, and project controls provisions to improve the owner's visibility into the progress reporting on the project.
- Analyzed schedule delay, productivity loss, and direct damages totaling over $1 billion allegedly resulting from problems related to hydrodynamic loads on a nuclear power plant reactor building in Ohio. This project involved the discovery of over one million documents that were subsequently scanned, imaged, and converted into a database utilizing state-of-the-art optical character recognition software.
- Reviewed operating performance problems on a cattle manure-fueled power plant and several agricultural waste-fueled power plants in California.
- Reviewed a $11 million claim involving the installation of new mechanical equipment on a power plant project in Tennessee.
- Prepared a $1 million claim involving the construction of new low NO_x and boiler reheater facilities on a power plant project in Indianapolis.
- Analyzed delay and disruption claims on the installation of three heat recovery steam generators as part of a retrofit repowering project in Louisiana.
- Analyzed delays and loss of productivity impacts caused by late delivery of equipment by the turbine/generator manufacturer on a new power plant project in Colorado. The schedule analysis also supported the contractor's defense of liquidated damages assessed by the owner because of delays caused by the turbine/generator manufacturer.
- Performed damage and schedule analysis and provided claims assistance on a geothermal power plant in California.
- Prepared a claim on the assembly of turbine generators on a hydroelectric power plant project in Colorado.
- Provided litigation support for a nuclear power plant project in Louisiana involving the assessment of cost overruns, delays, inadequate QA/QC documentation, and defective electrical and instrumentation installations.

- Analyzed delays and back charges on the construction of three gas-fired turbine generators and heat recovery steam generators on a power plant project in California.

Steel Mills and Coke Oven Batteries, Pulp and Paper Mills, Food Processing Plants, Synfuels Process Plants, and other Industrial Facilities

- Provided litigation support for a $400 million blast furnace and coke oven battery project in Indiana involving analysis of construction cost and schedule overruns and the adequacy of the engineering design. The owner claimed damages against the EPC contractor for cost overruns on the project. The EPC contractor had a reimbursable contract, but the owner alleged that the contractor mismanaged the project. This project resulted in a jury verdict award of $74 million in favor of the owner.
- Prepared a contractor's delay and loss of productivity claim against an owner cooperative on the construction of a $32 million soybean processing plant in South Dakota.
- Analyzed a Swedish contractor's delay and disruption claim involving the design and construction of a pulp and paper mill in Washington.
- Provided litigation support, database management system development, a technical design assessment, analysis of cost and schedule overruns, and start-up problems of a coal gasification project in Alabama.
- Analyzed a contractor's delay and loss of productivity claim against a Finnish equipment supplier providing a design build materials handling facility for a glass bottle manufacturing plant in Colorado. Analyzed the contractor's schedules, alleged changes to its scope of work, and cost records supporting its labor cost overruns. The case was resolved in arbitration in favor of the client equipment supplier.

Commercial, Educational, Medical and Industrial Buildings, Airports, Correctional Facilities, and Stadiums and Convention Centers

- On behalf of the owner, analyzed a Russian and Turkish contractor's claim for change orders, delay, and loss of productivity, and the owner's counterclaims for default due to inadequate project management performance and substandard installations of a residential community project in eastern Russia. Developed a document database, inspected the site, reviewed contractual entitlements, and provided the owner with a basis for negotiating a settlement with the contractor.
- Prepared a $1.2 million claim involving the electrical subcontract work on the chemistry building at the University of Washington in Seattle.
- On behalf of the insurer, evaluated property damage claims associated with flood-damaged industrial buildings and manufacturing facilities following a flood in Indiana. Prepared comparative cost estimates for the damaged equipment and facilities to test the reasonableness of the damage claims alleged by the owner.
- Prepared a $6 million claim involving electrical subcontract work on the St. Louis Stadium and Convention Center Project.
- Prepared a $4 million claim involving the electrical subcontract work on the Alaska Native Medical Center project in Anchorage.
- Analyzed a $1.5 million claim involving the mechanical subcontract work on a classroom building at the Air Force Academy.
- Reviewed a schedule delay consultant's expert report regarding a claim on a hotel construction project in Colorado and testified in arbitration regarding the thoroughness of the consultant's work and the costs it billed.

- Prepared an electrical subcontractor's claim for delays, extra work, and loss of productivity on the installation of fire alarm, security, and communications systems for the Federal Bureau of Prisons Project in Beaumont, Texas. The contractor's increased costs resulted from delays, changes, field work orders, rework, loss of productivity, and acceleration to the Division 17 installation work. Prepared an expert report and assisted counsel in the defense of the opposing expert's deposition, which resulted in a successful settlement of the dispute.
- Provided claim preparation, schedule and damage analyses for an airport expansion project in California.
- Performed claims analysis, construction oversight, contract administration and expert testimony for a surety involved in the mechanical installations on a prison project in Montana.
- Analyzed delay claims on the renovation of a hospital project in Oakland, California.
- On behalf of the subcontractor, prepared a schedule delay and damages claim for the fabrication and installation of glass and metal curtainwalls for the Memphis/Shelby County Library Project in Tennessee.
- Performed an analysis of a mechanical contractor's contract and *quantum meruit* claim for disputed changes in scope, delays, and loss of productivity on the installation of piping systems on a computer microchip manufacturing facility in Virginia. Presented testimony in arbitration.
- Provided litigation support for the construction cost overruns and delays for several commercial building projects in Texas including a luxury hotel and a major office building.

Wastewater Treatment Plants, Earth-Filled Dams, Lock and Dam Projects, Fiber Optic Communications Projects, and Concrete Wharf Projects

- Analyzed contractors' delay and loss of productivity claims against the owners of wastewater treatment plant projects in Ohio, Alaska, and New Mexico.
- Analyzed delay and disruption claims on the engineering, procurement, and construction of an industrial wastewater treatment plant in Trinidad.
- Performed delay/impact analysis and claims preparation involving an earth-filled dam project in New Mexico. This project resulted in a $55 million settlement from the U.S. Bureau of Reclamation.
- Analyzed $600,000 and $800,000 claims involving electrical subcontract work on two lock and dam projects in Louisiana.
- Prepared an owner/operator's claim against a major railroad for causing delays and cost overruns during the construction of fiber optic communications systems along the railroad's right-of-ways throughout the U.S. Developed schedule delay analysis of each of the right-of-ways along which the fiber optic cable was installed in trenches. Identified detailed daily documentation that identified railroad interference or lack of support for the installation of the work.
- Prepared schedule and damages analysis and provided claims preparation on a concrete wharf expansion project in California.

PROFESSIONAL EXPERIENCE

Long International, Inc.
Littleton, Colorado (September 1996 to Present)

Founder of an engineering and construction consulting practice specializing in engineering and construction contract dispute analysis and resolution, litigation/arbitration/mediation support, and expert testimony. In addition, Long International provides project management consulting, and claims prevention services through the development, application, and training in the use of integrated estimating, cost and schedule

control systems, and preparation of thorough project documentation. Long International also performs fire/explosion insurance services, including analyses of property damage and business interruption claims, as well as analysis of insurance coverage for delays and cost overruns, and reconstruction cost and schedule performance monitoring. Long International focuses its practice on owners, engineering and construction firms, and contractors in the petroleum refining, petrochemical, power/cogeneration, industrial, food processing, and other process industries worldwide.

Fischbach Corporation and Fischbach and Moore, Inc.
Englewood, Colorado (August 1995 to September 1996)

Senior Vice President, Contract Administration responsible for company-wide technical management, resolution, and prevention of construction claims. Fischbach Corporation owned Fischbach and Moore, Inc., and Natkin & Company, who were among the largest electrical and mechanical contractors in the U.S., respectively. In addition, responsible for developing and implementing project management policies and procedures for project selection, bidding, and project controls. Inherent in these new policies and procedures was enhanced control of the profit, cost, schedule, scope, quality, and safety objectives of projects through the use of standardized bidding practices, control budgets, as-planned schedule development, integrated cost and schedule controls, quantity tracking and labor productivity analysis, change order management, preparation of monthly reporting including correction plans for cost and schedule variances, delay and impact analysis, thorough documentation, and claims identification and mitigation. Member of executive-level project teams responsible for reviewing major, high-risk projects to identify potential problems and recommend corrective actions for cost and schedule recovery.

Hill International, Inc.
Englewood, Colorado (June 1993 to August 1995)

Senior Vice President responsible for managing all technical and business operations in Hill's Denver office. Grew the practice to five full-time consulting experts focused on the preparation and analysis of claims involving projects in the petroleum refining, petrochemical, and oil and gas production industry.

Kellogg Corporation
Littleton, Colorado (August 1983 to June 1993)

Vice President, Director of Operations and Principal in Charge of Dispute Services responsible for managing the dispute resolution practice, as well as the project and environmental business units. Lead expert in the analysis and resolution of over 200 claims projects, and frequently represented his clients along with counsel in settlement negotiations. Direct responsibility for marketing and sales, project and personnel management, cost control, and organizational efficiency.

Tosco Corporation
Aurora, Colorado and Los Angeles, California (May 1974 to August 1983)

As Project Manager, held overall responsibility for management, project execution planning, engineering contractor supervision, permitting, cost estimating, economic analyses, cost and schedule control, risk analysis, and management reporting for the Sand Wash Shale Oil Project in Utah. Specific accomplishments include preparation and implementation of a comprehensive project management plan and development of a cost/schedule control and performance measurement system for the engineering and construction phase of the project. Directed several major engineering contractors who were performing mining, materials handling, hydrocarbon recovery, and oil upgrading designs and cost estimates. Managed

the production of technical data to obtain a Final Environmental Impact Statement, PSD air quality permit, and numerous other federal, state and local permits. Evaluated the solid wastes generated by the mine, retort facility, and the oil upgrading facility, and managed the design of the solid waste disposal facility for containment of the hazardous and nonhazardous wastes. Performed a process evaluation for the wastewater treatment facilities. Responsible for the preparation of capital and operating cost estimates and economic evaluation of a $1 billion plus single-train shale oil facility and a $4 billion six-train shale oil facility.

Participated in the engineering development of the Colony Shale Oil Project including responsibility for the development of several cash flow economic evaluation computer models and preparation of capital and operating cost estimates and economic analyses used in the negotiation of the $1.1 billion project loan guarantee. As Technical Manager developed, alongside Exxon, the TOSCO II pyrolysis unit process design basis and equipment specifications, and developed a heat and material balance process simulation computer model of the pyrolysis unit design and a solids flow computer model, which was used to size and specify the rotating retort vessel. Also responsible for technical evaluation of improvements to the TOSCO II retorting facility and evaluation of various shale oil upgrading technologies including delayed coking, fluid coking, flexicoking and partial oxidation of the heavy oil fraction, as well as evaluation of alternatives of whole oil and separate naphtha and gas oil hydrotreating.

As Principal Project Engineer, responsible for the process design, environmental and waste management systems evaluation, cost estimating and economic evaluation of numerous oil shale and coal pyrolysis, combustion and gasification processes; hydrocarbon recovery and upgrading technologies for oil shale, coal, conventional petroleum and oil sands-derived liquids and gases; a petroleum coke gasification-combined cycle cogeneration process; and flue gas desulfurization processing options for a coke-fired refinery boiler. Evaluated the yields, cost estimates, and economics resulting from the pyrolysis of numerous coals and lignites, and developed the commercial process design basis, cost estimate and economics for several commercial coal pyrolysis and coal gasification/combined cycle cogeneration processes.

As Senior Process Engineer, responsible for planning, organizing, and managing research and development, cost estimating and economic evaluation efforts for pyrolysis and gasification technology development utilizing oil shale, coal, scrap tire and oil sands feedstocks. Operated and optimized several pilot and bench-scale units involving fluidization, combustion, chemical reaction, and solids transport, and developed the design basis for oil shale and spent shale gasification and combustion processes. Also developed and evaluated improvements to the heat utilization efficiency and hydrocarbon emission control for the TOSCO II process.

Fluor Engineers and Constructors
Houston, Texas (July 1972 to July 1973)

Senior Process Engineer responsible for the process design, flow sheet preparation, equipment specification, and bid evaluation of a 30,000 BPD crude oil vacuum unit. Performed technology and cost analyses of heavy crude oil hydrodesulfurization processes, as well as evaluation of upgrading processing alternatives and synthetic natural gas processes.

Continental Oil Company
Ponca City, Oklahoma (May 1970 to July 1972)

As a Process Engineer, responsible for producing final process designs for new and revamped refinery unit operations including several crude oil and vacuum distillation units, several hydro-desulfurization units,

a catalytic cracking unit, a naphtha reforming unit, a butane isomerization unit, several gas treating units, and various refinery utilities facilities.

PUBLICATIONS AND SPEAKING ENGAGEMENTS

Why Construction Claims Occur and How to Prevent Them, Virtualbookworm.com Publishing, Inc., College Station Texas, September 2021, ISBN 978-1-63868-016-1.

"Proving the Cause-Effect Linkage," with Rod C. Carter, CCP, PSP, and Harold E. Buddemeyer, Jr., *Long International, Inc.*, March 2018.

"Applications of Monte Carlo Simulations in Dispute Resolution and Claims Work," with Rod C. Carter, CCP, PSP, *Long International, Inc.*, December 2016.

"Differing Site Conditions," with Robert J. Lane and James E. Kelley, Jr., P.E., *Long International, Inc.*, October 2015.

"The Doctrine of Unjust Enrichment," with Andrew Avalon, P.E., PSP, *Long International, Inc.*, July 2015.

"Constructive Changes," *Long International, Inc.*, May 2015.

"Construction Claims Analysis Checklist," with Rod C. Carter, CCP, PSP, *Long International, Inc.*, April 2015.

"Implementing Time Impact Analyses on Large, Complex EPC Projects," with Rod C. Carter, CCP, PSP, and Ronald J. Rider, M.B.A., *Long International, Inc.*, July 2014.

Cumulative Impact and Other Disruption Claims in Construction, with Rod C. Carter and Harold E. Buddemeyer, Jr., *Virtualbookworm.com Publishing, Inc.*, College Station Texas, June 2014, ISBN 978-62137-527-2.

"Reservation of Rights to Make a Cumulative Impact Claim," *Long International, Inc.*, April 2014.

"Typical Problems Leading to Delays, Cost Overruns, and Claims on Process Plant and Offshore Oil & Gas Projects," *Long International, Inc.*, February 2014.

"Acceleration Claims on Engineering and Construction Projects," *Long International, Inc.*, December 2013.

"As-Built But-For Schedule Delay Analysis," *Long International, Inc.*, November 2013.

"Analysis of Concurrent Delay on Construction Claims," *Long International, Inc.*, October 2013.

"Preserving Your Claim through Documentation," *Long International, Inc.*, September 2013.

"Construction Claims for Variation in Quantity," *Long International, Inc.*, August 2013.

"Construction Contract Notice Letters," *Long International, Inc.*, July 2013.

"Defective and Deficient Contract Documents – A 2013 Update," *Long International, Inc.*, March 2013.

"Glossary of Scheduling, Estimating, Project/Construction Management, Contract Administration, and Construction Claims Terminology for Engineering and Construction Projects," *Long International, Inc.*, February 2013.

"EPC Contract Risk Analysis Associated with Onshore Projects in Developing Countries," with W. Tom Thweatt, *Long International, Inc.*, December 2012.

"Analysis of Concurrent/Pacing Delays," with Ronald J. Rider, M.B.A., *Long International, Inc.*, August 2012.

"Schedule Delay Analysis Methodologies," with Andrew Avalon, P.E., PSP, and Ronald J. Rider, M.B.A., *Long International, Inc.*, July 2012.

"Why Claims Occur – The Red Flags," *Long International, Inc.*, March 2012.

"Contract Scheduling Provisions," *Long International, Inc.*, February 2012.

"Discrete Damages/Cost Variance Analysis Method for Quantifying Damages in Construction Claims," *Long International, Inc.*, January 2012.

"Construction Claims Prevention," *Long International, Inc.*, November 2011.

"Evaluation of Changes in Process Plant Projects," *Long International, Inc.*, June 2011.

"Applications of Monte Carlo Simulations in Dispute Resolution and Claims Work," AACE International Annual Meeting, Seattle, Washington, July 2009.

"Schedule and Delay Analysis Methodologies," with Andrew Avalon, P.E., PSP, and Ronald J. Rider, M.B.A., Long International, AACE International's Professional Practice Guide to Forensic Schedule Analysis, Chapter 11: Method Implementation Protocol – Modeled/Subtractive/Single Simulation, 2008.

"Schedule Delay Analysis Methodologies," Construction SuperConference, with Andrew Avalon, P.E. and Ronald J. Rider, San Francisco, December 2007.

"Evaluating Effects of Changes in Process Plant Design," *Hydrocarbon Processing*, December 2004.

"Document Database Considerations," with Andrew Avalon, P.E., *Long International, Inc.*, May 2004.

"High-Tech Head Starts on Big Cases: Using Advanced Database Tools," *LEGAL TECH Newsletter*, March 2004.

"Cardinal Changes," with Andrew Avalon, P.E., *ABC Today*, May 2001.

"Constructive Changes," with Andrew Avalon, P.E., *ABC Today*, April 2001.

"Ownership of Float," with Andrew Avalon, P.E., *Central Florida AGC News*, April 2001.

"Differing Site Conditions," with Andrew Avalon, P.E., *Building Central Florida*, March 2001.

"The 'No Damage for Delay' Clause," with Andrew Avalon, P.E., *Central Florida AGC News*, March 2001.

"Specific Damages Analysis Method," with Andrew Avalon, P.E., *Central Florida AGC News*, February 2001.

"Delay Claims," with Andrew Avalon, P.E., *Building Central Florida*, January 2001.

"Modified Total Cost Claims," with Andrew Avalon, P.E., *Central Florida AGC News*, January 2001.

"Defective and Deficient Contract Documents," with Andrew Avalon, P.E., *Building Central Florida*, December 2000.

"Estimating Construction Claim Damages Using A/B Estimate and Delta Estimate Methods," with Andrew Avalon, P.E., *Central Florida AGC News*, December 2000.

"Quantum Meruit," with Andrew Avalon, P.E., *Central Florida AGC News*, November 2000.

"The Jury Verdict Method of Calculating Damages," with Andrew Avalon, P.E., *Central Florida AGC News*, October 2000.

"Total Cost Claims," with Andrew Avalon, P.E., *Central Florida AGC News*, September 2000.

"Acts of God / Weather," with Andrew Avalon, P.E., *Building Central Florida*, P.E., August 2000.

"Quantification of Damages," with Andrew Avalon, P.E., *Central Florida AGC News*, August 2000.

"Directed and Constructive Acceleration," with Andrew Avalon, *Building Central Florida*, July 2000.

"Apportioning Concurrent Delays," with Andrew Avalon, P.E., *Central Florida AGC News*, July 2000.

"Construction Claim Types," with Andrew Avalon, P.E., *Building Central Florida*, June 2000.

"Claims Mitigation during Construction," with Andrew Avalon, P.E., *Central Florida AGC News*, June 2000.

"Review and Approval of Detailed As-Planned Schedules," with Andrew Avalon, *Central Florida AGC News*, May 2000.

"Scheduling and Delay Analysis" and "Claims Prevention," Managing the Contractual Arrangements under a Typical EPC Contract, Trinidad, West Indies, October 1999.

"When a Traditional Construction Project Turns into an Environmental Project—What Do You Need to Know When Your Client Calls, Hypothetical Scenario and Video Animation," *American Bar Association Forum on the Construction Industry*, New York City, January 27, 1994.

"Delay and Disruption Damages," *11th Annual Construction SuperConference*, November 1991.

"Contract Schedule Preparation and Updating Provisions," *KC-News*, June 1991.

"How the Construction Attorney and Consultant Can and Should Work Together—Selection and Use of a Claims Consultant in Preparing or Defending a Construction Claim," *Fifth Annual Construction Litigation SuperConference*, December 1990.

"Liquidated Damages," *KC-News*, December 1990.

"Calculation of Damages in Complex Construction Claims," *11th Annual Cost Engineering Congress*, Paris, France, April 1990.

"Damage Recovery Using the Modified Total Cost Method," *KC-News*, March 1990.

"Claims and Asbestos Abatement," *ECON: Environmental Contractor*, September 1989.

"Introduction to the Claims Process for Asbestos Abatement Projects," *National Asbestos Council Conference*, Anaheim, California, March 1989.

"Claims Investigation and Analysis," *Minnesota Institute of Legal Education*, January 1989.

"Preparation and Use of a Claim Document," *American Bar Association Forum on the Construction Industry*, Minneapolis, October 1988.

"Proof of Damages in Construction Claims," *AACE 32nd Annual Meeting,* New York, July 1988.

"Contract Documents: Lessons from Litigation," *Civil Engineering*, May 1988.

"Maintaining Control of Your Technical Documentation," *The Construction Specifier*, April 1988.

"Management Considerations for Resolving Construction Disputes," *Project Management Institute 1987 Seminar/Symposium*, October 7, 1987.

"Defective and Deficient Contract Document: Options for Mitigation," *KC-News*, October 1987.

"The Owner's Defenses Against Spearin," *KC-News*, October 1987.

"The Contractor and Defective Drawings and Specifications," *KC-News*, October 1987.

"Proof of Damages Supported by Integrated Cost and Schedule Control," *KC-News*, July 1987.

"Arming the Attorney with a Computer in Complex Litigation Cases," *The Colorado Lawyer*, October 1986.

"The Proposal as a Contract," *The Construction Specifier*, September 1986.

"Guidelines for Resolving Construction Contract Disputes," *Chemical Engineering*, August 18, 1986.

"Software Facilities Information Access," *The National Law Journal*, August 4, 1986.

"Computerized Litigation Support," *KC-News*, April 1986.

"The Importance of Project Documentation in Recovering Your Costs," *American Subcontractors Association*, Las Vegas, March 1986.

"Comprehensive Preparation of Documentation for Construction Contract Disputes," *The Colorado Lawyer*, January 1986.

"Construction Claims Require Thorough Analysis," *Legal Times*, March 4, 1985.

"Proving Construction Damages—Which Method to Use," *Colorado Engineer*, March 1985.

"Applicability of the UCC to Construction Contracts," *Construction Claims Monthly*, August 1984.

EXPERT TESTIMONY

2018 Testimony in support of the owner of a nickel processing plant in Canada who allegedly breached the standard of care by the EPCm contractor, which resulted in significant delay and hundreds of millions of dollars in increased project costs. Performed a detailed CPM schedule delay analysis to calculate the owner's entitlement to recovery of time-related costs that it paid to the EPCm contractor and recovery of the owner's increased time-related costs that resulted from the EPCm contractor's delay to the project. June 2018. *Arbitration testimony*.

2016 Tribunal-appointed delay expert in a confidential ICC arbitration case involving an oil refinery in Europe. Issues included owner-alleged gross negligence by the EPCm contractor in performance of its engineering, procurement, and construction management work causing delay to the civil, mechanical, and electrical subcontractors and delay to the completion of the project. October 2016. *Arbitration testimony*.

2006 Testimony in support of an EPC contractor regarding a dispute involving over 400 change orders associated with an engineering and construction contractor's claim (client) on a magnesium oxide production plant in Jordan. Determined the cause-effect relationship among the changed work and the resulting schedule impact and additional costs. Also analyzed the validity of the plant performance test and the rejection of the plant by the owner, as well as the validity of the owner's defects claims against the contractor. Testified in ICC arbitration in London, United Kingdom. March 2006. *Arbitration testimony*.

2006 Testimony in support of the defense against an owner's claim for rebuild costs associated with the reconstruction of an oil terminal following a fire in Louisiana. *ANR Pipeline Company* v. *Holloman Construction Company and National Union Fire Insurance Company of Pittsburgh*, 16th District Judicial Court for the Parish of St. Mary, Louisiana, Division A, No. 110636. July 2006. *Deposition testimony*.

2005 Testimony in support of a paint manufacturer's defense against a general contractor's claim regarding delay and disruption costs resulting from the need to remove lead-containing paint

and then repaint an offshore production platform during fabrication and assembly in Texas. April 2005. *Mediation testimony*.

2003 Testimony in support of an owner's claim against a railroad regarding delay and increased costs during the engineering and construction phases of a fiber optic communications system along railroad right-of-ways in the northeast and Midwest United States. *Qwest Communications Corporation v. Consolidated Rail Corporation*, AAA Case No. 14Y 110 00381 01 FMA. February 2003. *Deposition Testimony*.

2003 Testimony in support of the defense against an owner's claim against a paint manufacturer for delay costs associated with the abatement of paint containing lead chromates from an offshore oil and gas production facility in the U.S. Gulf of Mexico. Analysis and testimony focused on the issue of concurrent delay associated with the various components of the offshore facility, including topsides, hull, risers, suction piles, and undersea pipelines. Plaintiffs were Dominion Exploration and Production, Inc., and Pioneer Natural Resources USA, Inc. and defendants were Ameron International Corporation and its insurers ACE American Insurance Company, Greenwich Insurance Company, American Home Assurance Company, AIU Insurance Company, and National Union Fire Insurance Company of Pittsburgh, Pennsylvania. Civil District Court for the Parish of Orleans, No. 2003-6945. May 6, 2003. *Deposition testimony*.

2003 Testimony in support of an owner's defense of a delay and disruption claim on an EPC LSTK project involving the analysis of change orders, delays, acceleration, and loss of productivity impacts associated with the relocation of an existing gas-fired turbine generator and the construction of a new heat recovery steam generator in an existing industrial plant in Alaska. Case Name: *Veco Alaska, Inc.* v. *AEG&T et al.*, Case Number: 3KN-10-164, Superior Court of Alaska, 3rd Judicial District at Kenai. January 2003. *Mediation testimony*.

2002 Dispute over increased costs and delay during the construction of the Westin Hotel in Westin Hotel in Westminster, Colorado by Hoffman Construction Company (client). Provided testimony concerning the reasonableness of the work performed and costs incurred by Hoffman's claims consultant. October 2002. *Arbitration testimony*.

2002 Testimony in support of a general contractor's claim involving delay and loss of productivity damages on a gas-fired combined cycle power plant in San Marcos, Texas. November 2002. *Mediation testimony*.

2000 Testimony in support of an owner's claim for overbilling on a reimbursable contract to fabricate offshore gas compression and wellhead platforms. *Transcoastal Marine Services, Inc. and Dickson GMP International, Inc.* v. *Chevron Global Technology Services*, C.A. No. 00-34073-H4-11, Unites States Bankruptcy Court for the Southern District of Texas, Houston Division. June 2000. *Deposition testimony*.

2000 Testimony in support of a mechanical/electrical contractor's claim involving change orders and delays on a hydroelectric power plant in Boulder County, Colorado, 2000. *Mediation testimony*.

1999 Testimony in support of an electrical contractor's delay and disruption claim on the construction of the Beaumont, Texas Federal Prison, September 1999. *Deposition testimony*.

1999 Testimony in support of an electrical contractor's delay and disruption claim regarding the construction of the Alaska Native Medical Center. Analysis and testimony involved analysis of delays to the electrical contractor's work caused by RFIs, scope changes, and delays to predecessor work. *Deposition testimony*.

1998 Testimony in support of the construction manager's defense against a mechanical contractor's delay and disruption claim on a microchip fabrication facility in Virginia. *John J. Kirlin* v. *Marshall/Hyman, J.V., et al.* Civil Action No. 172422-V, Track 4, Judge Donahue, November 1998. *Deposition testimony*.

1998 Testimony in support of the mechanical contractor's delay and disruption claim on the construction of a soybean processing plant project in South Dakota, 1998. *Deposition testimony*.

1998 Testimony in support of the construction manager's defense of a mechanical contractor's delay and disruption claim on a microchip fabrication facility in Virginia. *John J. Kirlin* v. *Marshall/Hyman, J.V., et al.,* Civil Action No. 172422-V, Track 4, Judge Donahue, 1998. *Arbitration testimony*.

1998 Testimony in support of a mechanical contractor's delay and disruption claim on a soybean processing plant project in South Dakota, 1998. *Mediation testimony*.

1995 Testimony in support of an owner's defense of an EPC contractor's delay and disruption claim on an oil refinery project in Trinidad, 1995. *Mediation testimony*.

1990–1992 Testimony in support of the mechanical contractor's installation delay and change orders claims regarding the construction of the Montana State Prison at Deer Lodge. Approximately 1990–1992. *Deposition testimony*.

1986–1988 Testimony in support of the insurance company's defense regarding a construction accident and the equipment supplier's responsibility for safety during equipment installation on a compressor station in Wyoming. Approximately 1986–1988. *Deposition testimony*.

1986–1988 Testimony in support of an insurance company defending the compressor manufacturer involving a construction accident case regarding the equipment supplier's responsibility for safety during equipment installation on a compressor station in Wyoming, approximately 1986–1988. *Trial testimony*.