Richard A. Gehse, P.E., ASP

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Background

Mr. Richard Gehse holds a B.S. and an M.S. in Engineering, is a registered professional engineer in multiple states, and is a certified Associate Safety Professional. He has extensive and diverse industry experience in power, metals, chemical, oil and gas, and material handling systems; wastewater and water treatment; onshore and offshore oil and gas; and petrochemical/refining sectors. His experience and industry knowledge cover over 40 years in areas of design, engineering, procurement, construction, engineering and project management, asset integrity assessments, scheduling, cost estimating, quality and control procedures, OSHA safe work practices, and contract management.

Mr. Gehse's litigation experience includes forensic analysis and testimony on a complex offshore FPSO oil and gas international arbitration construction dispute in excess of $300 million in damages. Having structural engineering, fluid wave mechanics, and construction backgrounds, he was able to testify on damage claim deficiencies, FPSO module stability following the overturning of a module during transport, FEED, steel fabrication, construction delay, and commissioning claims, and prepare documented counter-positions to support the arbitration process.

Mr. Gehse has also provided expert testimony in cases involving intellectual property claims for pressure vessel manways, auxiliary marine-style boilers, and equipment embedded software.

He has equipment/machine experience that includes gas turbines, steam turbines, power boilers, fire tube boilers, refinery furnaces, heat recovery steam generators, reformers, heat exchangers, relief valves, excess flow valves, custom machines and equipment used in the paper, refining, chemical, steel, aluminum, and related manufacturing industries, material conveyance systems, material samplers, presses, extruders, mixers, crushers, filters, sizing screens, feeders, dryers, rotary kilns, robotic paint spray systems, vapor recovery systems, et al. His analytical experience includes piping flexibility analysis, fluid and solid mechanics, failure analysis, corrosion analysis, finite element analysis, heat transfer, and energy conversion.

Mr. Gehse has experience in safe work practices and OSHA compliance for powered industrial trucks (PITs) and mobile equipment that includes mobile lifting cranes, crane safety, lift plans, load rigging, and lift platforms. He was certified in mobile equipment in 2018.

Mr. Gehse's technical areas of expertise include carbon steel, stainless steel and polyethylene piping systems, construction, potential impact area classification and radius of exposure assessments, heat mapping, vapor cloud dispersion modeling, equipment failure analysis, turbines, compressors, pumps, fans and other types of rotating equipment, barge, railcar and tanker truck loading and unloading systems, pressure vessels, furnaces, API storage tanks, aboveground, belowground and underwater piping, multi-purpose tubing for underwater service, pipeline pigging, welding procedures and safe work practices, over-pressure relieving devices, fire and explosion prevention, protection, and venting, damage limiting construction, process safety management (PSM) and risk management program (RMP) regulatory compliance, mechanical integrity, corrosion assessments, power generation, co-generation plants, and combined-cycle power plants.

Mr. Gehse's power plant experience includes coal, gas, and oil-fired units. He has hands-on experience with coal handling equipment, samplers, combustion, and fly ash. This includes coal ultimate analysis, coal sampling techniques, heat rate calculations, reflective properties of fly ash on boiler operation impact tests, and coal dust hazards.

Mr. Gehse has experience with sand plants related to sand utilized in the oil and gas exploration and extraction. This includes material handling, sizing, separation, and storage processes.

Mr. Gehse's storage tank experience includes design and inspection of welded, bolted, and non-metallic tanks. Applicable codes include API 650 and API 620. Condition assessments in accordance with PSM, for hazardous chemicals and API 653 code.

Mr. Gehse's background also includes software development and deployment of engineering technical applications. This includes the development of software for OSHA PSM and EPA RMP compliance, ASME B31G corrosion assessments, ASME B31.1, B31.3, B31.4, B31.8, and B31.8S tools. He has coded in numerous computer software and database languages, and interfaces such as HTML, Google Maps/Earth, and Navisworks. His previous positions in the IT field include information architect, software/systems analyst, database administrator, and software developer. He is experienced in industrial distributed control systems such as Siemens and Honeywell systems and PLC systems. Communication protocol was Modbus.

Mr. Gehse's wastewater and water treatment areas of expertise include plants at both industrial and public facilities. His fluid mechanics background has resolved several aeration issues related to DO/BOD levels necessary for bacterial survival in aerobic and anaerobic biological processes. He also has experience with control systems for Enterococcus faecalis and Escherichia coli reduction. Expertise in wastewater and water treatment equipment such as pumps, compressors, AWWA piping, clarifiers, API storage tanks, above- and below-ground piping, and instrumentation and controls.

He has managed new grass-roots capital projects as well as the re-vamping and renovating of existing oil, gas, fertilizer, and petrochemical projects. Mr. Gehse has been responsible for executing many complex EPC (engineering, procurement, and construction) assignments in the electric utility, metals, and oil and gas industries.

His rotating equipment experience includes pumps, compressors, fans, hydraulic converters/couplings, gear boxes, transmissions, steam and gas turbines used for power generation and prime movers, internal combustion and compression engines using gasoline, diesel, bio-diesel, natural gas, landfill gas, and LPG.

His refining/chemical experience includes offshore FPSOs, Pipestills, Hydrotreaters, Hydrocrackers, Fluidized Catalytic Cracking Units, Coking Units, Asphalt Units, Blended Oil Ultraformers, Reformers, Vapor Recovery Units, and related components such as API storage tanks, refractory, and utility systems.

His metals experience includes both steel and aluminum plants. For steel, systems include iron making, steel making and finishing. Process types include both BOF and EAF. For aluminum, equipment includes smelter pots cathode refractory, anode quality, calcined coke manufacturing, and logistics.

His welding experience includes the development/review of welding procedures, review of welder procedure qualification records (PQRs), preheat and postheat procedures, welding techniques such as SMAW, GTAW/ TIG, and GMAW, and welding safe work practices.

Professional Engagements

- **Power and Energy**
  - Chicago, IL, 103rd Street Waste-To-Energy Upgrade Assessment, lead analyst.
  - Chicago, IL, Cicero Waste-To-Energy Upgrade Assessment, lead analyst.
  - Nordic Power Organic Refuse to Energy Project (1991-1994), Design engineer.
  - Chicago, IL (1991-1994), Co-Generation Plant, design engineer.
  - Illinois Institute of Technology (1991-1994), Co-Generation Plant, design engineer.
  - Eagle, CO (1991-1994), Co-generation plant design engineer.
  - Wabash River Coal Gasification Repowering Project, General Electric Frame 6 Gas Turbine Generators, Heat Recovery Steam Generator (HRSG), construction manager.
  - Ameren Energy Venice Power Station Front-End Loading of Combined Cycle Gas Fired Power Plant, natural gas-fired, GE LM6000, HRSG, lead analyst.
  - USS, Gary Works, New Pig Caster Feasibility Assessment, project manager.
  - Commonwealth Edison, Joliet Station 29, Dual Fuel Conversion, lead engineer.
  - Commonwealth Edison Waukegan Station, Unit 8 Gas Fuel Conversion, lead engineer.
  - Commonwealth Edison, Collins Station, Gas Conversion, mechanical engineer.
  - PSEG's Bergen Power Station, GE LM6000 Dual Fuel Coking Issues, lead analyst.
  - PJM Reliability Assessment of PSEG's Bergen Power Station, lead analyst.
  - PJM Reliability Assessment of PSEG's Linden Power Station, lead analyst.
  - Waste Management, Joliet Landfill, Gas Extraction and Reciprocating Engine Power Generation, design engineer.
  - Waste Management, AZUSA Landfill, Gas Extraction and Reciprocating Engine Power Generation, design engineer.
  - Suncoke Energy, Granite City Coke Making Facility, Waste Heat Recovery Steam Generator Tube Failures, lead analyst.
  - Ameren Energy, Edwards and Duck Creek Power Stations, SCR NOx Environmental Control Systems, construction manager.

- **Metals and Mining**
  - United States Steel, Fairfield Works, pipe caster "blow-out" loss of cooling water, analyst.
  - United States Steel, Fairfield Works, cooling water system degradation from solidification of oil-based contaminants in cooling water piping, lead analyst.
  - United States Steel, Gary Works, Iron Making, new pig caster, and electric arc furnace (EAF), project manager.

- United States Steel, Gary Works, Steel Making, new BOF water-cooled hood, engineer.
- United States Steel, Coke Making, asphalt plant condition assessment and safety improvements, mechanical engineer.
- United States Steel, Coke Making, relief valve validation, lead analyst.
- United States Steel, Gary Works, Iron Making, pulverized coal injection system condition assessment and overpressure protection system validation, lead analyst.
- United States Steel, MinnTac iron ore mine, material handling upgrades, new chutes, flop gates and belt cleaners, design engineer.
- Inland Steel, East Chicago plant, underground cooling water piping break from extended failure of the cathodic protection system, lead analyst.
- Aluminum smelter plant in McCook, Illinois (no longer in operation). Analysis of anode failure. Process improvements on pot refractory and cathode. Lead analyst.
- FuelTech new calcined coke plant development for the manufacturing of anodes used in EAF and Aluminum smelters. Project manager and lead analyst.
- Aluminum aircraft parts finishing plant, Kansas City, dust collector explosion, analyst.

- **Pulp and Paper**
  - Rock Ten, West Chicago cardboard plant, dewatering press structure failure, finite element analysis, lead analyst.
  - Greif Inc., Alsip plant, paper roller structural failure corrosion assessment, lead analyst.
  - New-Indy board plant, North Carolina. Contract dispute with Wood Group. Testifying expert.

- **Wastewater Treatment**
  - BP, Whiting Refinery, sanitary sewer system oil intrusion, lead analyst.
  - BP, Whiting Refinery, sanitary sewer system re-design of 15 lift stations, lead analyst.
  - Chicago area chemical plant, complete biological wastewater treatment system to treat the categorical waste streams from the facility, engineering, and construction manager.
  - BP, Whiting Refinery, sanitary sewer discharge monitoring system, design engineer.

- **Fire Protection Systems**
  - Multiple locations (1976-1987), Joliet, Waukegan, Stateline, Powerton, Will County, and Crawford Stations, water supply reliability assessment and installation of 4000-GPM diesel-driven fire pumps, lead engineer.
  - Multiple locations (1976-1987), Joliet, Waukegan, Stateline, Powerton, Will County, and Crawford Stations, coal handling deluge, pre-action and wet pipe fire protection systems with continuous thermal detection, lead engineer.
  - Atlantic Electric, BL England Station, coal handling deluge, pre-action and wet pipe fire protection systems with continuous and spot thermal detection, design engineer.
  - Chicago, IL (1976-1987), Crawford Station, main power transformers deluge fire protection system, design engineer.
  - Multiple locations (1976-1987), 20 coal dust collection systems, relief panels and elbows, deluge fire protection systems, thermal detection, design engineer.
  - Chicago, IL, US Air Force Tactical Wing at Chicago O'Hare Airport, 2000-GPM diesel-driven fire pump, construction manager.
  - Morris, IL (1976-1987), Collins Station, air heater deluge fire protection systems, design engineer
  - Morris, IL (1976-1987), Collins Station, oil burner front deluge fire protection systems, design engineer.

- **Fire and Explosion**
  - Pekin, IL (1976-1987), Powerton Station, crusher house dust collector explosion investigation.
  - Pekin, IL, (1976-1987), Powerton Station, plant-wide explosion root cause.
  - Kincaid, IL, (1976-1987), Kincaid Station, dust collector fire and deflagration investigation.
  - Joliet, IL, Joliet Station, car dumper fire investigation.
  - Joliet, IL, Joliet Station, coal silo dust collector fire investigation.
  - Hammond, IN, State Line Station, coal dust pneumatic transfer system break and fire investigation.
  - Joliet, IL (1976-1987), Joliet Station 29, coal dust collector screw conveyor containment failure and deflagration cloud propagation, root cause analysis.
  - Midwest Utility, new coal blending control room, coal preparation equipment overpressure venting, technical opinion.

- **Root Cause Investigations**
  - Kincaid, IL (1976-1987), Kincaid Station, high-pressure main steam piping failure analysis via finite element analysis, lead analyst.
  - Joliet, IL (1976-1987), Joliet Station Unit 6, condensate pump cavitation failure, analyst.
  - Kincaid, IL (1976-1987), Kincaid Station, circulating water pump gearbox failure, analyst.
  - Joliet, IL (1976-1987), Joliet Station Unit 6, steam turbine water induction via leaking extraction check valves, lead analyst.
  - Joliet, IL (1976-1987), Joliet Station Unit 6, low sulfur coal conversion loss of boiler steaming capacity from high reflectivity ash deposits, lead analyst.
  - Chicago, IL (1976-1987), Powerton Station, plant-wide coal dust explosion, lead analyst.
  - Whiting, IN (2012-2013), BP Whiting Refinery, FCC fin tubed heat exchanger fouling, lead analyst.
  - Whiting, IN (2012-2013), BP Whiting Refinery, sanitary sewer system oil intrusion, lead analyst.
  - Kinder Morgan, fatigue failure of oil piping due to low-frequency vibrations, lead analyst.
  - Dust collector explosion backflow prevention pressure relief elbow, engineer.
  - United States Steel, Fairfield Works, pipe caster “blow-out” loss of cooling water, analyst.
  - United States Steel, Fairfield Works, cooling water system degradation from solidification of oil-based contaminants in cooling water piping, lead analyst.
  - Commonwealth Edison, Joliet Station 29, coal dust collector screw conveyor containment failure and deflagration cloud propagation, lead analyst.
  - Commonwealth Edison, Joliet Station 29, effectiveness of spray cooling to reduce circulating water discharge temperature to the Des Plaines River, lead analyst.
  - Rock Ten, West Chicago cardboard plant, finite element analysis of a dewatering press structure failure, lead analyst.
  - Chicago, IL, confidential client, root cause analysis of failed ammonia refrigeration system piping.
  - Greif Inc., Alsip plant, paper roller structural failure corrosion assessment, lead analyst.
  - Inland Steel, East Chicago plant, underground cooling water piping break from extended failure of the cathodic protection system, lead analyst.
  - Kansas City, MO, Aluminum aircraft parts finishing plant, dust collector explosion, lead analyst.
  - Waste Management, Joliet Landfill, reciprocating engine failure due to leachate infiltration into gas extraction system, lead analyst.
  - Naperville, IL, confidential client, root cause analysis of a failed ammonia-based refrigeration system.

- **Software and Software Development**
  - PEPSI (Protype Engine Parts Structure Interface).
  - FMEA (Failure Mode and Effects Analysis).
  - FRACAS (Failure Report and Corrective Action System).
  - OSHA 29CFR 1910.119, PSM Compliance Platform.
  - Mechanical Integrity PSM Element.
  - B31.8 ROE (Radius of Exposure) for H2S Vapor Cloud Dispersion, Google GIS Interface.
  - B31.8S PIA (Potential Impact Area) for Vapor Cloud Dispersion, Google GIS Interface.
  - B31G Corrosion Assessment Tool.
  - Google Map/Earth Heat Maps
  - Navisworks Database Queries
  - Caesar II Piping Flexibility

Forensic Engagements

- **Manufacturing and Industrial**
  - Bay City, TX, Tenaris Pipe Mill, Brahma v Tenaris, Construction dispute. Construction analyst.
  - Mexico, Decoplas, La Venta, Industrial Cuamatla, Cuautitlán Izcalli automobile parts manufacturer's robotic paint spray system fire and explosion investigation and claim cost estimate.
  - Texas (2017), Hurricane Harvey damage assessment for a glass and mirror manufacturer's 14 cutting, polishing, and tempering machines.
  - Taylor Charles vs. K-Patents, line-break personal injury. Litigation support.
  - Equistar v Indeck Power, construction dispute. Litigation support.
  - Frank v Gold Star Metals, LOTO, personal injury. Litigation support.

- **Power**
  - Indeck v Kiewit, Indeck Energy Niles Plant, freeze damage assessment.
  - Ascend v MasTec, Decatur, AL, Plant, Contract dispute.
  - Onward Energy v National Mechanical Services, Fountain CO, Investigate turbine bearing failure.
  - Lektrotect v William Davis Boilers, Fire tube boiler failure analysis.
  - Electromechanical Engineering Associates Exciter Collector, El Sauz CA, Turbine damage assessment.

- **Oil and Gas**
  - Acumen International, Jersey Village, TX, Root cause analysis of a fluid end failure.
  - Nortex Midstream Partners LLC v Motec Ltd, Compressor/diesel engine coupling failure analysis.
  - CMGT v TUPI BV, International construction dispute, 6 FPSOs, engineering and construction analyst. Arbitration support.
  - Root cause analysis of a compressor/diesel engine coupling failure and litigation support.
  - Wichita Falls, TX, Plains All American, Root cause analysis of a fire on an API 650 tank seal replacement.
  - Gulf Coast (2017), Hurricane Irma damage assessment on a USVI fuel terminal including six API 650 tanks, aboveground and belowground piping, pumps, structures, shoreline, underwater ship unloading piping system, fire suppression systems, diesel driven fire pump, electrical, security, and control systems.
  - High wind deformation assessment of API 650 storage tanks.
  - Dream v Buckeye Bahamas - Hurricane rain load analysis on an API oil storage tank.
  - Gerber v Anadarko, Line-break and LOTO personal injury. Litigation support.
  - Jason Little v HFOTCO, Hot work and LOTO personal injury. Litigation support.

- JBBR v Wilson & Company, Contract dispute railcar unloading. Litigation support.
- Marable v Reynolds Energy Transport, et al, Line-break personal injury. Litigation support.
- Joe Stinson v Surge Operating, Line-break and LOTO personal injury. Litigation support.
- KW Express v Wilson & Company, Contract dispute railcar unloading. Litigation support.
- DTE v Courtney Construction - Polyethylene piping failure.

- **Refining and Chemical**
  - Personal injury on unplugging a reside line at a coker unit.
  - Ammonia plant development for the production of fertilizer based on the Haldor Topsoe process.
  - Root cause analysis of a failed plastic pellet storage silo.
  - Equistar v Indeck Power, Construction dispute. Litigation support.
  - Anselmo Lopez v Dresser-Rand, Line-break personal injury. Litigation support.
  - McManus v American Mechanical Systems, Line-break personal injury. Litigation support.
  - Dearmon v Ohmstede Industrial, et al, Personal injury, Hot work safe work practices. Litigation support.
  - Seadrift Coke v Bobcat Heavy Civil, Construction dispute, litigation support.
  - Development of three gas-to-liquid plants for the production of diesel fuel and ammonia.
  - Keystone v Sypris Technologies - Personal Injury, manway operation.

- **Offshore Oil and Gas**
  - Petrobras v CMGT, FPSO analysis and litigation support.
  - Petrobras v CMGT, FPSO module transport wave stability analysis.
  - Valero, Texas City, Barge unloading arm fatality.
  - Total, USVI, Offshore tanker unloading system damage assessment.

- **Intellectual Property**
  - Lucas v Sypris, Patent research related to personal injury.
  - PCS Software, IP infringement assessment.
  - Equistar v Indeck Power, Control software IP dispute.

- **Agricultural**
  - Soybean silo failure analysis.
  - Corn starch silo fireball personal injury.
  - Nashville, TN, Advanced composites silo failure analysis.
  - M2Green mill plant demolition, starch storage silo product release, fire, and personal injury.
  - Root cause analysis of the failure of a large volume vertical turbine irrigation water pump switchgear.
  - Brandt v Lektrotech, contract dispute, fire tube boiler failure. Litigation support.

- **Infrastructure and Commercial**
  - Damage estimate of a motor/bridge impact.
  - Damage estimate API 620 tank/bridge impact.
  - Damage estimate of a truck/power line impact.
  - Damage estimate of a water purification plant clarifier sweeper mechanism.
  - Relocation analysis of 230 KV power lines for commercial property.
  - Root cause analysis of poor performance and stalling of fifteen (15) LPG-fueled buses.

- **Wastewater and Water Treatment**
  - Corpus Christi, TX, Corpus Christi wastewater treatment plant DO system analysis and litigation support, technical engineer.
  - Mancos, CO, Technical engineer on city wastewater treatment plant analysis and litigation support.
  - City of Houston East Water Purification Plant, estimate of damage to clarifiers.
  - Betzer vs. C.J. Mahan, Biscoe, AR, city water system E-Coli contamination.
  - Lyons, CO, Wastewater treatment plant construction claim analysis related to influent loading impact on plant operations.
  - Walmart, San Antonio, TX, Lift station failure damage assessment.
  - Summitt Properties v Summerwood Partners, Wastewater Treatment Plant. Analysis and litigation support.

- **Fire Protection System**
  - Houston, TX, MD Anderson Cancer Center, fire pump failure analysis.

- **Fire and Explosion Investigations**
  - Mexico, Decoplas, La Venta, Industrial Cuamatla, Cuautitlán Izcalli automobile parts manufacturer's robotic paint spray system fire and explosion.
  - Rayne, LA, Dorf Ketal Chemicals (Flow Chem Technologies), liquids transfer building fire, cause, and origin.
  - Wichita Falls, TX, Plains All American, root cause analysis of a fire on an API 650 tank seal replacement.
  - Foster v Texoma, personal injury, line-break. Litigation support.

- **OSHA Safe Work Practices**
  - Luna v Wolf Energy, Pipeline pigging, line-break personal injury. Litigation support.
  - Gerber v Anadarko, Line-break and LOTO personal injury. Litigation support.
  - McManus v American Mechanical Systems, Line-break personal injury. Litigation support.
  - Jason Little v HFOTCO, Hot work and LOTO personal injury. Litigation support.
  - Joe Stinson v Surge Operating, Line-break and LOTO personal injury. Litigation support.
  - Taylor Charles v K-Patents, Line-break personal injury. Litigation support.
  - Anselmo Lopez v Dresser-Rand, Line-break personal injury. Litigation support.
  - Randall Block v Westrock, Hot work personal injury. Litigation support.
  - Armstrong v Andritz, LOTO, Personal injury. Litigation support.
  - Frank v Gold Star Metals, LOTO, Personal injury. Litigation support.
  - Marable v Reynolds Energy Transport, et al, Line-break personal injury. Litigation support.
  - Dearmon v Ohmstede Industrial, et al, Personal injury, hot work safe work practices. Litigation support.
  - Travis Harper Dukes v Bridge Crane Specialists, Personal injury, LOTO. Litigation support.
  - Tubular Services, personal injury, line-of-fire. Litigation support.

- **Mobile Equipment and Powered Industrial Trucks**
  - Ramirez vs. Capstone Logistics, Inc., Pallet jack accident evaluation. Litigation support.
  - Elliston vs. TDR Systems, Inc., Crane lift evaluation. Litigation support.
  - Torres v. Transhorn Trucking, Inc. LLC, Forklift safety evaluation. Litigation support.
  - Yokohama Scizzor Lift Personal injury assessment.
  - Santiago v Amazon, Forklift truck personal injury. Litigation support. Trial.

Professional Experience

- **Rimkus** **2018 – Present**
  - Director, Global Energy Services
    Responsible for providing consulting and litigation support services to law firms, insurance companies, and corporate clients. Mr. Gehse has many areas of expertise including electric power, cogeneration, petrochemical, wastewater and water plants, pulp and paper, metals, and oil and gas facilities. Expertise in root cause analysis of failed equipment, construction claim cost verifications, delay analysis, OSHA safe work practices, crane safety, critical lift plans, and personal injury.

- **HCI Systems, Inc.** **2017**
  - Technical Lead
    Responsible for development of software technical solutions for the oil & gas industry including solutions for Pipeline Hazardous Material Safety Administration (PHMSA), B31.4, B31.8, B31.8S, B31G, CFR 192, CFR 195, et al.

    Geological information system specialist in the presentation of O&G data on a geological background including in-line inspection data, mechanical integrity data, documents and records, incidents, assets, action items, and unmanned aerial vehicle data. Subject matter expert and lead trainer for PSM/RMP codes, which included process safety information (PSI), process hazard analysis, management of change, audits, training, pre-start-up safety review, incident root cause analysis, layer of protection assessments, corrective actions, and emergency action plans.

    Investigated ammonia refrigeration system release incidents at two facilities in the Chicago area. Coordinated with facility owners and local authorities on root cause analysis, updating their PSM/RMP programs, performing system inspections, and assessing facility safe work practices.

- **Orbital Engineering, Inc.** **2013 – 2017**
  - Engineering Manager
    Technical Authority/Manager for various upstream, midstream, and downstream projects through the front-end engineering and design (FEED) process and construction. Lead Mechanical on a new tank storage terminal consisting of 12 storage tanks, 50 miles of piping, valve pit, and 24 pumps. Services included engineering, design, and construction support. Total installed cost (TIC) > $500mm.

    Experienced mechanical integrity engineer in pressure vessels, rotating equipment, ASME and API pumps, relief valves, storage tanks, piping, non-destructive examination (NDE) methodologies, B31G-2012 Level 0, Level 1, Level 2, and Level 3 corrosion assessments, B31.8S Integrity Programs, NACE specifications, CO2, O2 and H2S chemical corrosion, maximum allowable working pressure (MAOP) calculations, contracting, estimating, proposal preparation, and contract administration.

  - Senior Project Manager
    Project Manager seconded at BP Whiting Business Unit, Process Engineering Group. Responsible for managing CapEx projects ranging in size from $3M to $50M including furnace upgrades, process equipment upgrades, barge, railcar, and tanker truck loading and unloading systems. Experienced in executing project management front-end engineering and design (FEED) processes. including distributed control systems and PLC systems communicating with Modbus protocol.

    Experienced in facilitating process hazard analysis, management of change requests, process safety information, inherently safer design reviews, risk assessments, hazardous operation reviews and pre-start-up safety reviews, audits, incident investigations, root cause analysis, failure mode effects and analysis,

standard operating procedures, recognized and generally accepted good engineering practices (RAGAGEP), and training. Team member for safety integrated systems (SIS), safety integrity level (SIL) assessments, layer of protection analysis as applied to refinery projects.

- **Ambitech Engineering, Inc.** **2012 – 2013**
  - Senior Project Manager
    Project Manager seconded at BP's Whiting Refinery, Process Engineering Group. Responsible for managing CapEx projects ranging in size from $3M to $50M.

- **Middough and Associates** **2011 – 2012**
  - Senior Project Manager
    Project Manager for a new $500M ammonia-based fertilizer plant with integral combined cycle power plant utilizing shale gas as the base feedstock. Coordinated the development of the process flow diagrams and managed the plant siting team. Authored the execution plan and defined the scopes of work for the EPC project partners. Managed the development of natural gas routing and design per ASME B31.8 and S and interfaced with regulatory agencies.

    Project Manager for a new 5000 BBD/$300M natural gas-to-liquids (GTL) plant with integral combined cycle power plant utilizing shale gas as the base feedstock. Created the project team. Developed the project partner agreements, negotiating the natural gas purchase agreement and natural gas liquids sales agreements. Coordinated the integration of the technology vendors and managed the plant siting and ASME 31.8 natural gas pipeline routing teams.

    Project Manager for a process upgrade to a cokeless iron-making system to incorporate a new gas-to-liquid plant side stream. This upgrade will provide a new cash revenue source for these types of plants and provide increased utilization of excess CO2 for proper C/H2 syn-gas ratios.

- **Orbital Engineering, Inc.** **2007 – 2011**
  - Project Manager
    Engineering Project Manager at BP's Whiting Refinery. Responsible for managing CapEx and turnaround (TAR) projects. Responsible for BOU 2008 TAR and PCU 2009 TAR projects. Lead Mechanical for Lakefront Diffuser, 400# Steam system upgrade, and Duratherm Waste Reduction projects. Developed Decision Support Packages for CapEx projects. Developed support documents such as critical lift plans, risk mitigation plans, schedules, cost estimates, and project execution plans. Integrated safe work practices.

    Project Manager for a 125 TPH Pig Iron Casting Facility, a $70M project included rail transport system, certified scales, desulfurization system, dust control systems, impact conveying system, torpedo hot metal car unloading controls, accounting software, and two pig casting machines. Responsible for the project execution plan and associated sub-parts, performing safety orientation training and procedures. Project front-end loading (FEL) 2 was completed in 2011. FEL 3 pending synchronization with a new electric arc furnace.

- **Ameren Energy Resource Generating** **2003 – 2006**
  - Project Manager
    Seconded role at Ameren's Edwards Power Station. Responsible for the development of operation and maintenance procedures, mechanical integrity procedures, and selected catalytic reduction (SCR) system modifications. Setup and maintained the plant's PSM/RMP compliance program.

- **Sargent & Lundy** **2001 – 2003**
  - Construction Manager
    Site Construction Manager responsible for the construction, start-up, and troubleshooting of a selective catalytic reduction system utilizing ammonia-based reactant at the Ameren Electric Edwards Power Station. Provided technical analysis of process and design issues in support of contract disputes with the principal contractor. Responsible for execution of safe work practices and compliance audits. Provided technical opinions on crane lifts, air-flow stratification, electro-static precipitator impacts, catalyst plugging, induced draft (ID) fan impacts, and PSM/RMP compliance documentation. Responsible for daily coordination meetings and status update to plant personnel. Reviewed contractor invoice statements, requests for change order, and drawing as-builts.

  - Senior Associate
    Designed simple, combined cycle and re-powering projects utilizing gas turbines, heat recovery steam generators (HRSGs), and re-powering existing steam turbines with the process steam. Designed phased development plan for Ameren's Venice Station. Assisted clients with developing construction cost estimates and construction sequencing.

- **Analysis International** **1999 – 2001**
  - Project Manager
    Seconded role at BP's Research Facility at Naperville, Illinois. Responsible for interfacing between the research teams and IT groups for the development and deployment of web-based technical applications.

  - Information Architect
    Seconded role at Navistar's Engine Plant at Melrose Park. Responsible for the flow of information between product groups. Supervised a team of five to develop interfacing web and Windows-based applications to assist in communication, reduce errors, and increase efficiency. Applications developed included Engine Builder, X-Parts Inventory Control, FRACAS (Failure Result and Corrective Action System), PEPSI (Prototype Engine Parts Structure Interface), and Engine Test Data Analysis and Reports.

- **Orbital Engineering, Inc.** **1996 – 1999**
  - Engineering Manager/ Mechanical Dept. Manager
    Mechanical Department Manager/Engineering Manager responsible for technical content, safety training, quality, and business development for a multi-discipline engineering department. Primary industries included food, chemical, power, petroleum, manufacturing, and metals. Clients included electric utilities, aluminum and steel producing, chemical, and refining.

    Championed the planning, design, and execution of PSM and RMP programs. Significant work in documenting Process Information and Mechanical Integrity elements. Worked on approximately 12 PSM and RMP programs.

    Managed several major projects including two multi-tank bulk liquid storage tank farm projects, three process expansions with DuPont, numerous PSM/RMP projects, material handling projects, et al. Responsible for technical content including process analysis, pre-start-up safety reviews, relief vent design, pipe stress, pipe support design, seismic design of structures, finite element stress analysis, mass and thermal balances. Responsible for safe work training, safety audits, preparation of project execution plans and sub-parts. Responsible for civil/structural engineering and design. Experienced with soil analysis, foundation design, concrete and asphalt material, and steel structures.

- **Patterson and Associates** **1995 – 1996**
  - Construction Manager
    Construction Manager seconded role for a Chicago-area Organic Chemical Plant retrofitting their facilities with a biological wastewater treatment system. Responsibilities included design review, safe work practices, safety audits, budget and schedule status and projections, contractor supervision, contract preparation and administration, and field engineering. TIC was $20mm.

    The project consists of a complete biological wastewater treatment system to treat the categorical waste streams from the facility. Equipment included numerous water and chemical pumps, stainless steel piping, two 1,000,000-gallon biological tanks, one 400,000 surge tank, the installation of stainless steel trenches, isolation of existing non-categorical systems from categorical systems, electrical control systems, new 4KV electrical feed, process building, and associated permitting. Civil work included soil analysis, new support caissons, concrete foundations, and asphalt access roads.

- **Babcock & Wilcox** **1994 – 1995**
  - Construction Manager
    Mechanical site construction manager for the $500mm coal gasification plant with a General Electric LM6000 combustion gas turbine located in Terre Haute, Indiana. The project amassed over 600,000-person hours over a 7-month period working two 10-hour shifts 6 and then 7 days a week. Direct reporting supervisory staff of 35 personnel including safety, project engineers, administrative, and superintendents. Performed daily safe work audits, coordination meetings, and reporting updates. All 600 craft labor for the project was direct hired. No lost time accidents. Project was on-time and within budget.

- **Intercontinent Engineers, Inc.** **1991 – 1994**
  - Engineering Manager – EPC Team
    Lead analyst for the feasibility study to upgrade two waste-to-energy improvement projects for the City of Chicago. Project included material handling systems, separation, analysis of waste streams and conversion efficiencies for bulk combustion and steam generation. Steam generation was consumed by local commercial users with excess directed to new steam turbine generators. Flue gases were directed to treatment systems. Total project cost was estimated at $80M.

    Mechanical engineer for a waste-to-energy project utilizing waste wood chips and other organic waste material for this $30mm project. Project included material unloading, separation, transfer and ash disposal systems. Project was a complete turnkey from site selection to start-up and turn-over. EPC construction contractor was Nordic Power. Mechanical design engineer for several co-generation projects for a Chicago-area EPC contractor. Projects involved flue gas for product drying or plant heating. Clients included Eagle Gypsum, Viskase, and Illinois Institute of Technology.

- **Global Fire Protections Company** **1987 – 1991**
  - Manager – Special Hazards Division
    Responsibilities included sales, estimating, design, and construction supervision of mechanical and fire suppressions systems for industrial plants with specific emphasis on special hazards such as dusts, flammable liquids, and combustibles requiring deluge, pre-action, foam type systems, thermal, carbon monoxide, and Infrared detection devices. Experienced in dynamic loading analysis, design of seismic pipe supports, structure loading analysis, damage limiting construction, and coal dust mitigation systems that have merited publication in Power and Power Engineering magazines.

- **Commonwealth Edison Company** **1976 – 1987**
  - Project Manager

    Lead project engineer for over $100mm in material handling upgrades at nine low-sulfur coal power plants following multiple coal dust explosions that had national exposure. Upgrades included dust control bag-houses, special hazard fire detection and suppression systems, and explosion protection systems. Implemented new damage-limiting construction building design concepts that merited publication in the 1985 proceedings of the American Power Conference.

    Lead engineer in the “Coal Dust Awareness” initiative that presented the fundamental research on coal dust explosibility and methods to reduce risks to other electric utilities. Analyzed the catastrophic failure of a main steam line exposed to cyclic thermal quenching utilizing finite element analysis, analyzed various feedwater heater drain pump failures, performed a failure analysis associated with the collapse of a circulating water duct, performed a fundamental research program associated with the combustibility of dusts following several major coal dust explosions.

    Analyzed poor performance and/or failure analysis of various mechanical equipment, components and systems including pumps, fans, heat exchangers, cooling towers, combustion control systems, turbine/generators, ignition, warm-up and main fuel systems and various piping systems utilizing finite element analysis, thermal response of ASME piping systems, and fatigue failure analysis techniques.

  - Unit Engineer

    Unit engineer for a 350 MW(e) coal-fired power plant. Responsibilities included coal handling coal samplers, boil operation and heat rate calculations, ash handling systems, steam turbine/generator, black start diesel generator, and gas turbine peaking units. Responsible for scheduling equipment maintenance, outages, inspections, performance and environmental tests, and tracking plant thermal efficiency. Supervised craft labor crews on repair of major equipment items such as furnaces, pumps, compressors, fans, turbines, generators, boilers, etc.

Education and Certifications

- **Mechanical (Energy) Engineering, M.S.:** University of Illinois (1976)
- **Dual Major Structural and Thermo-Mechanical Engineering, B.S.:** University of Illinois (1975)
- **Registered Professional Engineer:** Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Idaho, Illinois, Louisiana, Mississippi, Montana, North Carolina, New Mexico, Oklahoma, South Carolina, Tennessee, Texas, and Utah
- **Current Membership:** ASSP
- **Safety Certification:** ASP-41055
- **Past Memberships:** IEEE, ASME, ASCE, AIChE, NFPA
- **Past Principal Member**: NFPA 68 – Deflagration Venting
- **Past Principal Member:** NFPA 69 – Explosion Protection
- **Mobile Equipment Certification** (2018)
- **OSHA 30**

Continuing Education and Training

- **Boilers:** Boiler Technology; Cogeneration Systems Essentials
- **Chemicals:** Flammable and Combustible Liquids; Chemical Unloading Basics

- **Combustion and Fluid Mechanics:** Combustion Analysis; Water Industry Hydraulics; Combustible Dusts; Compressible Flow Components Analysis; Brayton Cycle Analysis
- **Construction:** Anatomy of Construction Defects
- **Cranes:** Cranes in Construction Worksite Safety; Crane Lift Planning
- **Design:** Wind Design Using ASCE 7-16
- **Energy Conversion:** Energy from Waste
- **Estimating:** Construction Cost Estimating
- **Fire Protection:** Water Based Fire Protection; Understanding Fire Sprinkler Drawings and Calculations
- **Heat Transfer:** Heat Transfer Theory and Applications; Heat Exchangers: Cooling Towers; Heat Exchangers: Operation of Shell and Tube Types; Heat Exchangers: Condensers and Reboilers
- **Motors:** Electric Motors
- **OSHA Safety:** Process Safety Management; Safe Work Permits; Struck By Hazards - Construction Worksite Safety; Walking and Working Surfaces; Fall Protection; Supported Scaffold Safety; Line Breaking Safety; Confined Space Entry; Aerial Work Platform Safety; Hot Work Safety; Safety Management: Job Hazard Analysis; Bollard Boot Camp - How to Protect Places and People from Vehicle Incursions; Lockout Tagout for Authorized Employees; Lockout Tagout for Affected Employees I; Lockout Tagout for Affected Employees II; Safety Management: Incident Investigation; Steam Pipe Safety; Fuel and Combustion Systems Safety; Line of Fire Safety
- **Petroleum:** Fundamentals of Petroleum Engineering; The Petroleum Industry - Crude Oil Classification; Aboveground Storage Tanks
- **Pumps:** Pumps: Rotary Positive Displacement Types; Centrifugal Pumps I; Centrifugal Pumps II; Centrifugal Pump Curves and Theory; Pumping Stations
- **Reliability:** Reliability Engineering Essentials
- **Scaffolds:** Scaffolds and Mobile Elevated Work Platforms
- **SteamTraps:** Condensate Recovery and Steam Traps
- **Transmission and Distribution:** Transmission and Distribution: Power Quality; Transmission and Distribution: Framing Specifications and Basic Construction Diagrams; Transmission and Distribution: Introduction to Transmission and Distribution Systems
- **Turbines:** Steam Turbine Power
- **Valves:** Valves: Basic Types and Operation, Part 1; Valves: Types and Operation, Part 2
- **Water Treatment:** Essentials of Industrial Wastewater Treatment; Drinking Water Quality - Water Treatment Technology; SMART Instrumentation in Biological and Chemical Treatment
- **Welding:** Arc Welding Basics; Arc Welding Processes