Exhibit 1 - Cogent Experts, LLC

Domestic and International Expert Witness & Forensics Solutions

Michael A. Pollock, P.E.,
Principal Engineer

Education

- Drexel University, B.S. Mechanical Engineering, Cum Laude – 1998
  Mechanical Systems, Machinery, Thermodynamics, HVACR. Electives – Psychology
- Completed Drexel's E^4 Program – "Enhanced Engineering Education for Engineers"

Registrations

- Professional Engineer: PA (PE075410)
- American Bar Association (ABA) – Construction Forum
- Environmental Protection Agency (EPA) Clean Air Act Certification – Universal (includes Chillers, HVAC & Refrigeration)
- United States Patent & Trademark Office Registered Patent Practitioner (USPTO)

Professional Affiliations

- American Society of Mechanical Engineers (ASME)
- American Society of Heating, Refrigeration, Air Conditioning Engineering (ASHRAE)
- American Arbitration Association (AAA)
- Certified Energy Manager (CEM)
- Product Developers and the Manufacturers Association PDMA

General Experience

Mr. Pollock has over 25 years of engineering experience managing regional, national and global projects in designing, consulting, project and construction management, construction safety, construction scheduling, construction schedule delay analysis, remediation, operations, facilities / real estate, contract administration, engineering finance, pricing and economics. He has provided subject matter expertise in engineering / engineering standard of care, facility design and operations, manufacturing / manufacturing standard of care, equipment and systems technology, product and raw material deficiencies, defect identification and elimination. As a complex problem solver, he has worked on matters in venues including insurance, original equipment manufacturers (OEMs), businesses and facility operations, manufacturers, contractors, engineers, architects, and consumer claims, as well as in representing various other stakeholders.

His expertise includes design and engineering of commercial, industrial, manufacturing, institutional, and residential venues, as well as efforts relating to services and products used in and around these facilities. Business and industries include electronics, safety and construction, building materials, polymers and plastics, instrumentation manufacturing, petrochemicals, chemicals, pharmaceuticals, colleges, athletic facilities, textiles, coatings and resins, food storage, biosciences, supermarkets, inks & pigments,

automotive, facility and real estate operations, agricultural, transportation, nuclear, healthcare, food processing / nutrition, retail, distributors, pulp and paper, packaging, utilities, apparel, and R&D centers.

Mr. Pollock is a subject matter expert in commercial and industrial engineering applications and projects, as well as engineering standards and applicable codes including: ASHRAE, ASME, NIST, NFPA, NBIC, ASTM, SAE, LEED, API, ASCE, GMP, ISA, BOCA, Plumbing Standards, Manufacturers Standards Society (MSS), and various EPA Regulations. Mr. Pollock has developed expertise and provided training on engineering standards, chillers, chilled water / glycol, coatings, refrigeration, thermodynamics, water treatment, steam systems and boilers, corrosion, power and utilities, energy conservation, distillation, environmental, safety, HVAC, project management and product development / investment engineering economics. Mr. Pollock has also engaged with local, state, and governmental officials and agencies regarding numerous matters over his commensurate years of experience.

Forensic Consulting & Expert Witness Experience

Philadelphia Construction Related Injury Matter – Investigated an ~$8M (million) matter relating to a personal fall and injury, occurring from the multi-story rooftop onto the concrete walkway at grade. Our analyses included a site inspection, a review of case documentation, construction documents and drawings, and OSHA safety/International Mechanical and Building Code rules. Reviewed findings with counsel and issued an expert report. This matter settled favorably as reported by counsel.

FDA Plastics Distribution Facility HVAC matter in West Virginia – Investigated a 120,000 sq. ft Food and Drug Administration grade plastics warehouse for reported condensation, insulation, Indoor Air Quality (IAQ), HVAC, building envelope and roofing related issues. Reviewed relevant architectural and engineering design documents and drawings for the facility and advised counsel on expected liability and overall findings to have our client be dismissed from the case.

International Trade Commission (ITC) Matter – Construction Schedule Delay Analysis, Texas Reviewed an approximate $1B construction project for a major petrochemical / resin manufacturing facility including analysis of raw materials and pricing, process systems engineering, a distillation type desalination water treatment facility, utilities, MEP (mechanical – electrical – plumbing), structural aspects, underground systems, corrosion aspects, air permits, wastewater permits, manufacturing buildings, process systems etc., to determine the expected timeline to completion and provided expert opinion to counsel.

~175 Unit Condominium Complex Alleged Construction Defect Matter in New Jersey – Evaluated a ~$10M construction defect claim which included alleged defect allegations regarding utilities, water distribution, underground piping, fire water, domestic water, sanitary sewer, expansion joints, MEP (mechanical – electrical – plumbing) aspects. Developed strong defenses for client and counsel regarding the alleged defects leading to a favorable settlement of the matter for our client.

Supermarket Heating Ventilation, Air Conditioning & Refrigeration (HVACR) Matter in Florida - Provided expert witness field inspection and investigation of relevant medium and low temperature refrigeration, HVAC and mechanical systems at a ~140,000 sq foot facility which caused wet conditions due to excessive condensation. Developed an expert opinion and guided counsel in deposition questions and developed the case strengths and weaknesses yielding a negotiated settlement favorable to our client.

Warehouse Distribution Facility – Maryland - Evaluated a $10M (million) purported construction defect claim by the 600,000 sq. ft. facility owner against the facility construction contractor and an original equipment manufacturer (OEM) relating to installed infrastructure in the facility. Relevant technologies included HVAC, coatings, corrosion, facility operations, repair and remediation methods, grinding, and structural aspects. Developed and provided an expert opinion and expert report regarding the analysis of the purported defects and a proposed repair solution to correct said defects. Reviewed numerous reports regarding the matter including structural, repair/maintenance, operations related etc. to determine opinion. The matter settled favorably for our client prior to federal court trial.

Psychiatric Hospital Facility – North Carolina – Evaluated a $28M (million) construction defect and schedule delay claim by the general contractor against a hospital facility concerning a $100M facility construction project. Developed an expert opinion and report for general construction issues, constructability, design revisions, and corresponding delay analysis for mechanical, piping, HVACR, electrical, smoke and fire, structural, security and building automation systems. Reviewed findings with multi–discipline experts for mediation, leading to a negotiated settlement favorable to our client.

New Construction Hotel Facility HVAC, Pennsylvania – Provided an expert witness investigation with field inspections and issued an expert report for a construction defect / product defect and liability matter relating to numerous refrigerant piping failures and leaks. Aided counsel in settling this matter favorably for our client prior to trial.

Municipal Building/Facility - Northern NJ - Evaluated and provided expert witness mediation testimony regarding a $3M construction schedule delay claim by general contractor against municipal facility concerning an $8M renovation and new construction project. The relevant construction schedule analysis included review of plaintiff's claim, project schedules, critical path & time impact considerations, delays, pay applications, contract terms, change orders, consequential & liquidated damages, lien and bond issues, correspondence and numerous other project documents. Guided mediation to quickly develop a very favorable settlement for our client.

Public School Building(s) – Central NJ – Investigated a $1M construction defect and schedule delay claim regarding the facility's electrical distribution system retrofit construction project. Identified standard of care issues stemming from defects in the construction documents. Provided case strengths and weaknesses and expert witness analysis leading to favorable pretrial settlement for our client.

Multiple Residential Construction Defect Claims, PA – Pennsylvania – Reviewed and evaluated multiple construction defect claims including construction materials, sewers, water infiltration, building envelope elements, flood / water damage of residential/commercial construction buildings considering or in active litigation. Performed site visits and inspections during tear-offs and provided forensic analyses of expert reports, materials & methods of construction, construction documents, building code requirements, and humidity infiltration. Developed expert witness materials for the relevant legal team for use in arbitration / mediation hearings

to a negotiated settlement favorable to our client.

Forensics & Expert Witness Work-in-Progress

2026 - Utility Steam System Matter - Delaware

2026 - Commercial Bakery/Process Manufacturing Lines Construction/Mechanical Defect Matter - New York

2025 – Courthouse Mechanical Systems, Piping, Refrigeration Matter - Kentucky

2025 - University Facility - Construction fall matter/ladder issue - Delaware

2024 – Industrial Manufacturing Facility Fatality Matter, Process and piping related - Texas

2024 – Chemical Manufacturing Equipment Failure / Repair Investigation of Distillation Columns, Heat Exchangers, Pressure Vessels, Reactors - Texas

2020 to 2024 (Ongoing) - Display Technology Patent Infringement / Licensing Matters

2024 – School Building Construction / Demolition, Asbestos Abatement, Below Grade Piping Matter – Philadelphia

2024 – Refrigeration System / Centrifugal Compressor Failure Analysis - Virginia

2024 – Mechanical Failure / Product Liability, Manufacturing Standard of Care Matter

2024 – Commercial Facility Accident / Fatality Matter

2024 – Correctional Facility - Refrigeration / Condensation Matter, slip and fall Injury Matter.

2024 – Metallurgical Plumbing System Failure and Flood Matter - Pennsylvania

2024 – Multiple Building Envelope / Construction Matters – Failed Siding, Stucco, Insulation, Plumbing, Sprinkler Systems

2023 – Natural Gas Powered Electrical Generation Construction Defect Matter, Product Liability Matter

2023 – Commercial Facility Construction Defect Matter

2023 – Residential Water Infiltration / Water Damaged Building Envelope Insulation Matter

2023 – Multi-Discipline Construction Defect / Construction Schedule Delay and Cost Overrun Matter, Performed Court Testimony

2023 – Condominium Facility HVAC Construction Defect Matter

2023 – Flooded Facility due to Fire Sprinkler System Failure Matter, Remediation Estimating

2023 – District Heating / Commercial Steam Distribution System Operations Matter with Injury

2022 – Church Construction Defect Matter Relating to Building Envelope, Structural and Roofing Failures

2022 – Fire Matter Determination of Causation and Manufacturing Standard of Care and Product Liability / Product Negligence

2021 – Industrial Manufacturing Facility Standard of Care Matter, Construction Defect, Construction Schedule Delay Analysis

2021 – State Highway Construction Project Defect & Construction Schedule Delay Matter

2021 – New Construction Hotel Facility HVAC Project Management / Construction Defect Related Matter

2021 – Automotive/RV Fire Causation, Product Liability / Manufacturing Matter

2021 – Condominium Complex Construction / Building Envelope Matter

2021 – Structural Matter Relating to Alleged Construction Defects and a Collapsing Structure

2020 - State Highway Construction Project Defect & Delay Matter – Multiple Locations

2019 – Multiple Residential Stucco, Building Envelope, Weather Resistance Barrier (WRB), Insulation Construction Defect Matters

Commercial & Industrial Investigations

Research and Development Labs Buildings – Delaware – Researched and provided mitigating efforts for several electrical substation failures (500 KVA to 38 MVA) including fires and explosions. Performed Root Cause Analysis (RCA) to determine contributing factors including oil issues, poor maintenance, age, insulator breakdown, and wildlife intrusion. Developed preventative maintenance measures, design alterations, life expectancy and replacement criteria for substation capital planning. Performed consequence analyses including financial and personnel safety profiles to minimize risk.

Industrial Park/R&D Center – Delaware – Evaluated numerous process systems with wastewater environmental excursions. Led process engineering efforts for the facility to manage the issue, reducing process excursions from 14 annual occurrences down to 1 occurrence, and avoided expected capex of $8M to $15M for a planned infrastructure project to correct the problem.

Agricultural Research and Processing Facility – Newark, DE – Investigated the catastrophic failure of a flue gas recirculation (FGR) fan on a high–pressure steam boiler, including materials of construction and metallurgical analyses. Found traces of sodium on the carbon steel fan wheel along with corrosion and cracks, pitting, both macro and minor. The root cause analysis identified tube failures as the sodium source causing boiler water to introduce to the air side of the combustion system. A stainless-steel fan

wheel was specified for the new design to prevent future failures. The expedited project prevented facility downtime risk estimated at a $500K daily value.

Office & Research Facility – Delaware – Reviewed a near miss water hammer incident, where poor condensate removal during a steam system startup forced a slug to burst a valve assembly causing high pressure steam emission in a mechanical room where personnel were in general proximity.

Pulp and Paper Company – Chester, PA – Investigated structural and civil engineering of concrete foundations in the manufacturing facility underneath large paper processing equipment to identify causes of vibration. Performed vibration analyses on rotating equipment and on concrete structure, isolating the problem areas to the lower foundation section. Devised a solution with a resin injection company to reconstitute damaged portions of the foundations. Efforts were done with di minimis interruption to operations, with a daily production rate of $500K in sales.

Four Star Hotel & Offices – Rodney Square, Delaware – Investigated, engineered and improved many aspects of facility operation, mechanical systems, indoor air quality (IAQ), HVAC, building automation systems (BAS), boilers, combustion tuning, chillers, utilities billing and metering to 3rd parties, steam leaks, piping distribution, to achieve increased reliability for the overall facility.

Commercial Supermarkets – US Nationally (PA, MI, WI, CA, DE, MN, UT, NY, OH, FL)
Performed investigations of refrigeration system issues, including fires during maintenance activities. Determined the cause of the fires were improper oil removal (vs. the perceived flammability of refrigerants) and advised owners and operators to fully and positively de–inventory refrigerant oil before the use of any open flame (torch) around the system. This recommendation led to reduced risk for the facilities and reduced potential litigation. This also prevented the release of incorrect information, such that the refrigerants were flammable, when they were not. Also, investigated the release of refrigerants to ambient due to improper replacement of seals and gaskets as recommended by the Original Equipment Manufacturer (OEM).

Roofing and Building Materials Manufacturer – Mexico & Brazil – Evaluated roofing and roofing membrane products, including general properties, sustainability, energy aspects, greenhouse gas (GHG) and life cycle properties (cradle to grave). Findings were utilized in the development of product and marketing materials.

Building Materials Manufacturer – Richmond, VA & Wilmington, DE – Evaluated product properties of Tyvek building wrap including general product properties and infiltration benefits to residential and commercial buildings. Investigated blower door data, performed ASHRAE, TRANE and "Energy 10" simulations to estimate a 10% reduced infiltration for buildings with certain types of moisture barrier protections. Issued findings and co–authored a paper on the findings which were utilized in aiding the development of product claims and marketing materials. Interfaced with EPA, Department of Energy (DOE), and Oak Ridge National Laboratory (ORNL) as part of the effort.

Residential & Commercial Foam Insulation Manufacturer – Wilmington, DE – Performed a product comparison of spray foam insulations including R-Values, manufacturing and application costing. Performed a product liability analysis for a proposed next generation drywall material (vs. gypsum) and determined flammability risks of the new application were too high and recommended against the new application.

Coatings and Colorants Manufacturing Facility – Investigated an EPA refrigerant release due to a large centrifugal chiller, finding the root cause to be contract maintenance. Met with the owner and the contractor to discuss and prevent future occurrences ($1 million value). Investigated a large process cooling tower causing reliability and downtime losses in production valued at $1M per day. Implemented changes with plant operations to correct maintenance issues to deliver uptime benefits.

Country Club & Golf Course – Delaware – Investigated a new product application failure on an HVAC system causing reliability and potential Indoor Air Quality issues (IAQ). Worked with multiple OEMs with recommendations for the supplier OEM to use the new product only in compatible units, avoiding substantial commercialization costs and potential litigation.

Petrochemical Manufacturing Facility – West Virginia – Investigated the (vacuum) collapse of a large product storage silo and implemented corrective action, including reforming the vessel and safely welding stiffener rings (in a Class 1 Div. 1 atmosphere) in strategic locations. Investigated a large production fire caused by a plugged rotary blower on a pneumatic product conveying system. Implemented a 2 of 3 voting control scheme to provide safety interlocks to shut the system down to prevent future fires. These upgrades delivered uptime and reliability benefit to a $1M per day operation.

Petrochemical Facility – **LaPorte, TX** – Reviewed OSHA findings and the facility owner's operations and maintenance activities regarding four fatalities that occurred during the facility startup after maintenance activities on the unit. Findings indicated unfamiliar situations for operations personnel.

Consumer Products/Injection Molding Manufacturer – Milford, CT – Performed a Route Cause Analysis (RCA) for a consumer product line regarding quality and safety concerns. Reviewed both the intermediate materials manufacturer, and the end use manufacturer's facilities (injection molding), and determined the problem was contamination at the former's facility. Investigated the relevant quality and operations procedures and found operations had not performed the requisite quality checks appropriately. Additionally, an equipment overhaul was required. Led the expedited $600K machine overhaul to successfully rebuild the manufacturing equipment per OEM specification.

Electronics/Coatings Manufacturer, Joint Venture – Sayreville, NJ – Evaluated failures of hot water heat exchangers (HX) used to condition HVAC systems of Class 1,000 and 10,000 clean room operations, causing product quality and downtime issues. Determined the Materials of Construction of the HX were prone to erosion due to fluid velocity and recommended replacement with Stainless Steel.

Mixed Use Facilities – Globally – Reviewed and investigated personal injuries and incidents including slips, trips and falls, hand injuries, back injuries, fork truck incidents, ergonomic injuries, hearing loss, an electrical related loss of limb accident, a breathing air fatality, construction and facilities injuries, vehicle accidents, NESHAPS exposures, asbestos incidents, asbestos remediation, lock tag try incidents, excavation incidents, confined space and asphyxiation risks, trenching and shoring up incidents.

Mixed Manufacturing / Armored Products Facility – Deepwater, NJ – Participated with the investigation team to review a serious fire that occurred on a thermal oxidizer system (newly refurbished) incineration unit just after startup of the armored products intermediates manufacturing unit. Team findings showed the design-build firm failed to consider the possibility of backflow in a portion of the circuit. As such, the materials of construction in this section were inappropriate for use with high temperature flue

gas which melted that section and caught fire. The team's recommendations included upgrading materials

of construction, increased instrumentation and unit controls, and awareness training for both the design firm & unit operations. The estimated value of lost downtime for this event was $20M. Worked in and around high hazard processing areas inclusive of phosgene, hydrofluoric acid HF, chlorine gas, tetrahydrofuran THF, nitrogen (asphyxiant) etc.

Electronics Developer & Manufacturer – Santa Barbara, CA – Led design, engineering, and construction management of a semi-works facility scale up. The scope included upgrades to building and structural infrastructure, utility systems, prototyping/production areas, clean rooms and labs, as well as office and administrative areas at multiple locations. Maintained a fast-paced project schedule and kept project on budget to successfully complete the $40M project.

Automotive Coatings Production Facility – Philadelphia, PA – Investigated new products in the development, scale up and commercialization of automotive/polymer based resins, various coatings, and inkjet inks. Chemistries utilized included acrylics, solvents, urethanes, acetates, acetones, ethanols, mercaptan, xylene, isocyanates, esters, naptha, toluene, acids / bases, ethylene, benzene, tetrahydrofuran, etc.. Ran R&D efforts for new formulations, catalysts, processed test batches on reactors, distillation systems and media mills, and performed product quality and performance tests. Made recommendations to business stakeholders regarding whether to proceed with proposed formulations.

Managed operations (~20 direct reports), inventory, warehouse, engineering, maintenance and scheduling of product wheel on 6 process coatings resins manufacturing lines. Purview included full administrative control over several production reactors and distillation columns with over $80M in annual production. Significantly reduced production overtime in a union environment. Analyzed customer coatings failures (complaints) for truck, auto, and airline products by forensically tracing back to manufactured batches and checking for process upset causation. Reviewed and led portions of consequence analyses (CA) regarding catastrophic failures of facility systems including explosions, detonations, fire, and potential loss of life calculations to ascertain risk of operations. Managed Toxic Substances Control Acts (TSCA) requirements in a High Hazard facility.

Textile, Safety, Armored Products & Construction Products Manufacturer – Richmond, VA –Performed an infrastructure risk assessment of a large industrial manufacturing complex (including products manufactured for U.S. Department of Defense contracts) with focus on risk of downtime valued at $1.5M/day. Developed $70M in capital project recommendations including upgrades to the water and wastewater systems, chillers (18000-ton capacity review), brine refrigeration, 30MW turbine generators, utilities infrastructure and distribution systems, heat sink/spray pond. Implemented upgrade projects with site engineers over several years to deliver uptime improvement benefits for the site.

Commercial Research & Office Facility – Greenville, DE – Reviewed the failure of a 500 KW Diesel Generator used for peak shaving and determined the catastrophic failure of the supercharger assembly. Reviewed the electrical savings and financial impact related to the generator and determined no functional savings from continued operation. Recommended ending the use of the peak shaving generator, avoiding a capex replacement savings of $300K.

Mechanical Systems Design Firm – Kalamazoo, MI – Investigated a new product failure, a one-ton hydraulic box dumping system, for a packaging and distribution facility. Developed a design upgrade in

conjunction with the design-build firm at the facility. The main repair was the replacement of bushings on the main pivot shaft with sealed, internally lubricated bearings. The device worked well following the upgrades and kept a $250K per day production online.

Extrusion Manufacturing Facility – WV – Performed root cause analyses of two fires that occurred during operation: (1) extruder head and (2) extruder barrels. Successfully implemented process and administrative controls to eliminate additional fires, with uptime savings estimated at >$1M. Witnessed and reviewed a large absorber column and flare fire with serious catastrophic potential. Findings included loss of operational discipline (O.D.) in a Process Safety Managed (PSM) facility.

Pulp & Paper Mill – Southeast PA – Reviewed uptime and reliability issues in the converting and packaging operations. Identified archaic equipment and controls, recommending upgrades to achieve a 4% to 6% uptime benefit. Reviewed a fork-truck pedestrian incident, and other injuries at the facility and recommended upgrades to operating procedures to avoid future occurrences.

Petrochemical Manufacturer – Newtown Square, PA & Houston, TX – Investigated a reactor (bomb) explosion caused by a polymer decomposition in an R&D Lab. Determined chemistry was likely incorrect and recognized that the vessel ruptured disc was inappropriate. Made recommendations to process chemist and modified the ruptured disc design to avoid future occurrences. Designed several process systems relevant to piping, pressure vessels, reactors, distillation, tanks.

Nuclear Power Generation Facility (Reactor Services) – Berks, PA – Participated in reactor maintenance and refueling for the reactor services and turbine group at multiple 2200 MW facilities. Participated in the investigation of a 1100 MW turbine trip during routine operation at the facility, with downtime losses estimated at $500K – $1M daily. Worked with the turbine and reactor services teams to collect data and determine causation to be electrical synchronization issue in the generator. Managed portions of maintenance of a 125 Ton Refueling Overhead crane and the fuel floor bridge crane, designed structural supports for refueling equipment and emergency seals for the spent fuel pool. Performed maintenance on control rod shoot-out steel on underbelly of reactor.

Subject Matter Expertise & Consulting

1999 – 2019 Dupont / Dow-Dupont

Dupont, Dow-Dupont, – Wilmington DE, Nationally & Internationally – Led project and process upgrades in global facilities, with focus on: (1) Uptime, Reliability, Capacity, Quality, Yield, Safety, (2) Operating Cost and Capex Avoidance (3) Utilities, Emissions Reductions, Sustainability (4) Training and Mentoring Personnel on methods. Business methods included Lean manufacturing, Six Sigma (DMAIC), infrastructure management, Operational Excellence & Discipline (OE, OD), Quality Assurance (QA, QC), project and investment financial analyses (NPV, ROI), supply chain & pricing negotiations, leveraged engineering, utilities optimization, continuous improvement and problem solving. Technical Competencies included Process Technology, HVAC, Refrigeration, Cooling Towers, Automation & Controls, Combustion & Emissions, Cogeneration, Distillation, Mechanical / Hydraulic / Pneumatic Systems, Concrete, Piping, Instruments, Structural, Maintenance, Reliability, Fire & Life Safety (FLS), IT systems and data and Process Safety Management (PSM). Facilities included petrochemical, electronics, packaging, resins / polymers, automotive, food processing, incineration, supermarkets, manufacturing etc.

2016 – 2019 Dupont Company, Technology & Engineering Manager in Facilities Services and Real Estate – Delaware – Led engineering technology, personnel, governance, and business oversight for 4 mixed use macro facilities in Delaware. Technology disciplines included mechanical systems, electrical, plumbing/piping (MEP), instrumentation, controls, chemical, automation, facilities, fire and life systems, power and utilities, information technology (IT), Building Automation Systems (BAS), site-wide security systems. Facilities included manufacturing, product R&D, 3rd party leased spaces, real estate valuations, real estate parcel cost analyses, construction cost analyses, construction estimating, a thermal waste treatment facility, offices and corporate HQ.

Key responsibilities included personnel management, capital and infrastructure planning, project management and execution, capital avoidance, operations cost administration and reduction, demand services, financial investment analyses and Process Technology (PT) Leadership for Process Safety Managed (PSM) Systems, Process Hazards Analysis (PHA) - both high hazard (HHP) and low hazard processes (LHP). Businesses included chemicals, polymers, electronics, safety and construction materials, agriculture, nutrition & health, biosciences. Provided Third Party Tennant technical support for Axalta®, Chemours®, Nemours® Hospital, Incyte® Corporation, Delaware Innovation Center® and DOW® Chemical facilities.

Research & Development Facilities > 50 Buildings – Delaware – As part of the site leadership team, led the facility Emergency Management Team (EMT) for planning, personnel management , communication system and protocol development, with management of site emergencies including: accidents, injuries, fires, electrical outages, loss of refrigeration for catalysts, hazardous and radioactive waste discoveries, Highly Toxic Material (HTM) exposures, site evacuations, fire drills, environmental management, spill management and containment.

Process Safety Management & Risk Managed Operations (PSM) – Delaware – Co-led the facilities PSM program, while leading the Process Technology (PT) element, for macro facilities in DE. Managed authority of numerous elements of the process including, Management of Change Technology, Process Hazards Analysis (PHA), Process Hazards Review, Quality Assurance, Mechanical Integrity, Start Up Reviews, Standard Operating Procedures & Conditions (SOP's and SOC's). Evaluated Requirements vs. Optional Items to optimize project and cost budgets of the facility. Managed Factory Mutual/Hartford Insurance Inspections for national operations.

Mechanical Systems Engineering – Delaware – Led and provisioned the overall governance for the design and engineering for over 8000 mechanical systems, including HVAC, relief protection (RV's), distillation columns, reactors, piping, pressure vessels, process engineering, process technology, pressure loss calculations, through utilization of a mixed engineering staff. Classified systems in "Simple", "Moderate", "Complex" to track billable engineering hours for productivity benchmarking. Increased overall engineering productivity by 10 to 15% by keeping appropriate metrics, KPI's, and reviewing with engineering supervisors monthly. Developed a screening requirement to ensure capital projects over $50K were in fact requirements under regulation (ASME) and intercompany standards. Managed contract engineering staff for Kellogg Brown & Root (KBR), Jacobs, Pennoni and Delaware Engineering including billing and invoicing, budgeting and reporting to upper management. Reduced and/or increased contract engineering staff with ebb and flow of work.

Research & Development Facilities – Delaware – Conducted the R&D Tax Credit (RTTC) efforts for several facilities in Delaware for three years. This annual program accounted for all expenses spent on R&D activities, including personnel, utilities, operations expenses etc., to be submitted for IRS tax credit purposes. The annual benefit for the corporation was greater than $2M each year.

Site Security Systems – Delaware – Led technology aspects of building security, artificial intelligence (AI), camera installations (facial recognition), Andover Building Automation (BAS), tenant / 3rd party customer security systems, along with site and corporate security experts. Replaced an inept service provider with a qualified provider to ensure functionality and reliability of systems.

Commercial Supermarkets – US Nationally (PA, MI, WI, CA, DE, MN, UT, NY, OH, FL) – Led technology, market, and sales development for Dupont's refrigeration products in N. America. Developed a national tech staff to support new product lines and support customers' installations and field trials. Granted a "Marketing Excellence Award" for building a new business segment from $2.5 to $25 million in sales, in 3 yrs. Major customers were: Walmart®, Kroger®, Sears®, Lowes® and Target®. Retrofitted numerous refrigeration food systems for vegetables, meats, dairy, poultry, frozen foods, bakery etc.

Food Products / Processing Facilities – WI, KA, IA – Evaluated food process / production, biomass systems for multiple US facilities which had been purchased, operated and expanded by Dupont, including Danisco, Genencor, Solae, and Pioneer. The analyses related to the production of food products under FDA regulations (21 CFR) including, process heating and cooling systems, chillers / refrigeration, propylene glycol, and HVAC systems used in manufacturing. The product venues of these facilities included enzymes, soy, proteins, corn, culture blends, oilseeds, grains etc.

Nylon & Textile Manufacturer – Seaford, DE – Evaluated a 30 MW turbine generator to identify a condenser leak. Devised methods for repairs, assisted in implementation, yielding $500M annual savings (in perpetuity). Performed engineering for several DowTherm hot oil (high hazard) systems.

Major Global US Manufacturer – U.S. Concerns – Led energy, sustainability, air pollution, water pollution, ground pollution and emissions metrics and optimization for numerous commercial and industrial facilities. Audited facilities, provided high ROI energy conservation projects, corrected utility billing errors and compiled emissions data for the DOE (NOx, SOx, CO2, VOCs, HAPs, NESHAPs, MACT). Developed energy reduction practices at facilities to reduce energy expense and Green House Gas (GHG & carbon credits), valued at ~$70M (2006 - 2015). Awarded an "Exceptional Merit" citation by the American Chemistry Council (ACC) for related projects and presented these publicly at the Industrial Energy Technology Conference (IETC) in New Orleans, LA.

Product & Intellectual Property Developer – Radnor, PA – Specified, assembled, commissioned, programmed, and operated CNC machine tool equipment for prototyping. Built Solid works 3D models and simulated new product parts and assemblies. Commissioned an SLA polymer 3D printer for prototypes and worked with fabricators to make components for products. Revised products on beta testing, performed commercialization activity and authored / prosecuted patent applications.

Rockwell Automation – Wilmington, DE & Cleveland, OH – Engineered process controls, combustion

controls, data and IT systems. Involved in >$5M of projects over 10 years. Equipment included fans, turbines, motors, drives, HVAC, dampers, pumps, valves, controls, tuning, PID loops, sensors (flow, pressure, temperature, O_2, NO_x, SO_x, particulate, opacity). Led Layers of Protection Analyses (LOPA) and consequence analyses to ascertain controls and instrumentation (I&C), and process probabilities of failure. Required higher reliability I&C to correct failure rates to an acceptable failure rate range. Reviewed "black box" concerns to find deficiencies in control systems. Integrated changes to existing system to satisfy regulatory (NFPA), intercompany combustion and emissions requirements.

Packaging, Chemicals, Electronics Manufacturer – Sayreville, NJ – Performed numerous consulting activities including analyses of domestic (city) water hydraulics, a 1M gallon storage tank corrosion and pitting assessment, a cogeneration plant bankruptcy and re-comissioning, site utilities and HVAC energy assessments, production reliability, building automation systems (BAS), commercial water treatment facility review including cost per 1000 GAL and underground aquifer analyses, leased equipment cost avoidance, fire tube boiler inspections, chilled water systems foaming, water conservation efforts, the elimination of unused buildings and utilities. Effort benefits developed $4.5M annually with an NPV of ~$15M.

Refinery – Delaware City, DE – Performed operations consulting to improve uptime of refinery systems including spent sulfuric acid recovery, thermal oxidizers and other High Hazards Processes (HHPs). Compared actual and permitted emissions and issued recommendations to simplify operation.

Pulp and Paper Processing and Manufacturing – Chester, PA – Led operations engineering to develop a 10% capacity increase with a financial benefit of $38M annually. Refit existing paper converters and packaged product in new format with focus on machine design to increase unit throughput. Performed engineering, installed, and maintained Perini®, Paper Converting Machine Co. (PCMC®), and Scott Paper® machinery to drive reliability, uptime and quality optimization. Qualified a new raw material process on manufacturing equipment to save $250K in cost annually.

Nuclear Utility Facility – Peach Bottom, PA – Evaluated reliability related failures of cranes, including the reactor refueling bridge crane and an overhead 120 Ton Crane. Reviewed reliability issues during outages causing production losses of over $500K / day. Worked with operations to increase reliability, reevaluate spare parts and perform maintenance (PM) on a recommended frequency.

Automotive & Instrumentation Manufacturer – Germantown/Philadelphia – Performed manufacturing engineering including product and equipment design, project management, vendor qualification and design build management. Technologies included automated TIG welding fabrication, Failure Mode Effect Analysis (FMEA), intellectual property (IP), CNC manufacturing, stamping, and pressing, vision systems and GE Fanuc programming. Manufactured products were airbag and electronics parts, involving claymore mine detonators.

Acid Recovery Facility – Fort Hill, OH – Developed a steam turbine generator project using excess process (exothermic) steam to produce electricity with a 40% ROI and $300K annual savings. Reviewed process engineering aspects of manufacturing including reactors, piping, distillation systems etc.

ARCO Chemical Company – Newtown Sq., PA/Channelview, TX – Performed piping, pressure vessel,

pumps, distillation towers, reactors and process engineering including drawing, modeling, pipe flexural stress analyses, ASME vessel calculations and Finite Element Analysis (FEA) and failure prediction. Performed design and engineering for multiple macro polyolefins, propylene, polypropylene and polyethylene production facilities. Interpreted aspects of piping and pressure vessel codes and standards inclusive of ASME, 31.1, 31.3, ASME Section I, VIII. Performed engineering for numerous projects with Flour Daniels®.

2001 – 2026 Real Estate Investor
Invested in numerous real estate properties in multiple states, tracked and evaluated pricing/price increases, reviewed real estate index pricing for multiple geographies, reviewed tax benefits, performed cash flow analyses, performed construction estimating, managed and performed construction/rehabbing/remodeling of homes.

Project Management Expertise

Safety Products Manufacturer Facility – Cooper River, VA – Led many aspects of project management including developing business objectives, scope, engineering investment analyses, designing, planning, scheduling, sourcing, staffing, budgeting, designing, equipment specifications, estimating, cost over-run analysis, bidding, constructing and commissioning of a $500M Greenfield project installation. Relevant facilities commissioned successfully on time and budget.

Industrial, R&D, Lab and Office $400M Facility & Infrastructure Expansion (Facilities Services and Real Estate) – Led many aspects of project and construction management including design engineering, cost and capital management, construction estimating, real estate pricing analyses, planning, scheduling, managing overruns, conceptual design and production design for projects to expand and refurbish an existing $1B dollar facility which included: $19M Cooling Tower Project, $10M 38KV / 33MVA Purchased Power Substation, $21M Boilers Installation & Conversions Project, $18M Underground Piping Distribution Replacement and Relining, $8M Pipe Bridge Replacement, $7M Fiber – Network – Data Upgrades, $30M Fire & Life (F&LS) Upgrade Program including distribution systems, $12M Chiller Replacement, $5M Sewer Systems Upgrade, $4M Thermal Waste Incinerator Overhaul, HVAC & Air Handler upgrades, numerous multimillion dollar structural and building expansions, and several parking, roads & grounds improvements (including drainage management). These efforts allowed the continued operation of this facility which had an estimated value of $2M per day.

Manufacturing, Cogeneration Plant, Mixed Use Facility – Sayreville, NJ – Engineered, designed, and performed project management for a $5.7M boiler facility project inclusive of boilers, de-aerator, water treatment systems, an economizer, distributed controls (DCS), emissions management, building & structural. This effort avoided potential significant downtime of a $1.5M daily production rate facility. Performed structural and civil engineering analyses of cooling tower and water tank infrastructures for continued operation.

Facilities and Real Estate Business, Delaware. Received a "Business Excellence Award" for completion of projects. Efforts reduced budget by $12M/yr. and avoided $17M in capex. Projects also reduced the energy and environmental footprint of the facility, were completed on time, and $4M under budget.

Professional Training & Seminars

- American Arbitration Association – Construction Schedule Delay Arbitration
- Building and Facility Management (Dupont Training, spanning 2016 – 2019)
- Line Breaks, Lock Tag Clear Try, Pipe Codes, Process Safety Management, Pre-Start Up Review (PSSR), Process Hazards Analysis (PHA), Mgmt. of Technology Change, Contracted Services.
- Mechanical Engineering – Mechanical Integrity Quality Insurance (MIQA), Pipe Codes, Rotating Equipment, Repairs & Changes, Reliability Engineering, MIQA Audits, Quality Control (QC) of Materials / Spare Parts, Maintenance Procedures, Welded Repairs / Alterations / Rerating, Piping and Insulation Systems, MIQA Program Awareness, Piping and Service Compatibility, Distillation Towers, Distillation Columns
- Construction – Scaffolding, Barricade Safety, Line Breaks, Lock Tag Clear Try, Contract Administration, Confined Space Training, Contractor Management
- Power & Utilities Power Systems – Steam Systems, Condensate Draining, Steam Generation, Stationary Generator Design, Thermal Waste Incineration, SOC's, Process Hazards Anal. (PHA)
- Controls & Instrumentation – Alarms & Management, Electrical Safety Controls
- Environmental – Air Emissions, Hazards Communications, Title V Permit
- Safety Management – Asbestos, Barricades, Ergonomics, Fire Extinguishers, Diminished Capacity Employees & Supervisors, Driver Safety, Process Safety Management (PSM)
- Electrical Systems – Troubleshooting Circuits, Disconnecting & Removing Electrical Circuits, Electrical Standby Person Requirements, Electrical Safety Awareness, Electrical Area Classification
- Health – Access to Medical Records, Injury and Illness
- NFPA 101 – Life Safety Code
- Safety Training – Slips, Trips and Falls
- Programmable Logic Controllers, Wilmington 2015
- Artificial Intelligence: Technologies for Smart Systems Design, Wilmington, 2014
- CNC Machining Technology, Wilmington, 2014
- EPA & OSHA Training, Wilmington, DE, 2006
- Professional Engineering Review – Mechanical Engineering, Drexel, 2007 (63 hours)
- ABB Control Systems, ABB University, Atlanta, 2005
- Decision and Risk Analysis (D&RA), Wilmington 2006
- Certified Engineering Manager Course for Energy Managers, Atlantic City, 2008
- YORK Industrial Refrigeration Training, York Process Systems, 2002

Awards

- Granted two U.S. Patents, including 9,974,993 and 10,561,880 - consumer product related.
- Successful Wastewater Process Controls Award, DuPont Facilities Services & Real Estate, 2018

- Business Excellence Award, DuPont Facilities Services, Real Estate, Energy Operations, 2017
- Team Project Excellence Award for Completion a $500M Manufacturing Facility, 2013
- Certified Energy Manager (CEM), Association of Energy Engineers, 2011
- Marketing Excellence Award for DuPont Refrigerants and Project Teams, 2008
- Refrigerant Recovery Certification, Delaware, 2006
- SIX SIGMA CERTIFICATION, Global Services Business, 2003
- Certificate of Achievement, Effective Combustion and its Control, North American Mfg. 2002

Software & Programs

- Navisworks 3D / Smartplant 3D
- Solidworks 3D, Fushion 360
- Autodesk
- Pro-Engineer
- PDMS Plant Design Management System
- Microstation, AutoCAD
- Rhino CAD
- Computer Aided Machining (CAM)
- Revit
- ASPEN, ASPEN plus - Process design, simulation and optimization
- Matlab
- Primavera – Schedule Analysis
- Pipeflo
- PV Elite (Pressure Vessel Elite)
- Ceasar II – Pipe stress and flexural analysis
- Energy 10 (DOE)
- FEA- Finite Element Analysis
- TAPRooT
- Microsoft Projects