ROBERT A. ADAMS, P.E.
Owner & Principal – Adams & Christensen Engineering, Inc.

PROFESSIONAL ENGINEERING LICENSES

Alabama, Arizona, Arkansas, Colorado, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana. Michigan, Minnesota, Mississippi, Nebraska, New Jersey, New York, North Carolina, Oklahoma, Pennsylvania, South Carolina, Texas, Virginia, Wisconsin, and Wyoming. Current NCEES Record.

PROJECTS EXPERIENCE

WATER/WASTEWATER TREATMENT AND MANAGEMENT

Wastewater Pretreatment System, Confidential Site
Complete Water Services, LLC – Taylorsville, Indiana
Project Manager and Engineer for process mechanical design of a DAF-based wastewater treatment system as part of a new plant. Work included piping design and layout, hydraulic modeling, and pump selection.

Wastewater Pretreatment System, Dyma Brands
Complete Water Services, LLC – Bremen, Georgia
Project Manager and Engineer for process mechanical design of a DAF-based wastewater treatment system as part of a new plant. Work included piping design and layout, hydraulic modeling, and pump selection.

Wastewater Pretreatment System, UTLX
Complete Water Services, LLC – Cleveland, Texas
Project Manager and Engineer for process mechanical design of a DAF-based rail car wash water treatment system modifications. Work included piping design and layout, hydraulic modeling, and pump selection.

Wastewater Pretreatment System, King's Hawaiian Bakery
Complete Water Services, LLC – Flowery Branch, Georgia
Project Manager and Engineer for process mechanical design of a DAF-based wastewater treatment system as part of a new plant. Work included equipment layout, piping design and layout, hydraulic modeling, and pump selection.

Wastewater Pretreatment System, The J.M. Smucker Co.
Complete Water Services, LLC – McCalla, Alabama
Project Manager and Engineer for process mechanical design of a DAF-based wastewater treatment system as part of a new plant. Work included piping design and layout, hydraulic modeling, and pump selection.

Wastewater Pretreatment System, Castellini Company
Complete Water Services, LLC – Atlanta, Georgia
Project Manager and Engineer for process mechanical design of a DAF-based wastewater treatment system as part of a new plant. Work included equipment layout, piping design and layout, hydraulic modeling, pump selection, and HVAC design.

Biosolids & Septage Processing Facility
Sedron Technologies – Indiantown, Florida
Worked with Sedron Technologies to develop Engineering Report for permit approval of a biosolids and septage dewatering facility and served as the Professional Engineer of Record for the permitting process.

Wastewater Treatment System Modifications - Underground Injection Well Pretreatment System
Shamrock Environmental Corporation (Republic Services) – Mulberry, Florida
Developed design and construction expansion of a Central Waste Treatment (CWT) facility to be implemented in three phases. Work included piping system design, P&ID development, development of associated specifications and equipment schedules.

Wastewater Treatment System Modifications – 30% Design
Shamrock Environmental Corporation – Browns Summit, North Carolina
Developed 30% Design for expansion of a Central Waste Treatment (CWT) facility. Expansion included new unloading pumping system, new settling tanks for Class A, B, and C wastes, and associated piping and instrumentation.

Wastewater Treatment System Modifications – Membrane System
Shamrock Environmental Corporation – Browns Summit, North Carolina
Developed final design and construction documents for expansion of a CWT facility. Expansion included a new membrane treatment system for Subcategory C Waste.

Wastewater Treatment System Modifications – Unloading & Equalization
Shamrock Environmental Corporation – Browns Summit, North Carolina
Developed final design and construction documents for expansion of a CWT facility. Expansion included a truck unloading system, strainers, and equalization tanks.

Mobile Treatment System
Shamrock Environmental Corporation – Browns Summit, North Carolina
Developed preliminary drawings for a mobile waste treatment system for rapid deployment at multiple sites.

Basis of Design for CWT
Shamrock Environmental Corporation – Tampa, Florida
Developed a Basis of Design Memorandum, general arrangement drawing, and process flow diagrams for a proposed CWT facility.

Low Volume Wastewater Piping Reroute
Interstate Power and Light (IPL) – Lansing Generating Station, Lansing Iowa
Project manager for design of piping modifications and addition of a new effluent storage tank for wastewater generated at a coal-fired power plant. The design consisted new piping, new tank with oil detection system, CO_2-based pH adjustment system, heating and recirculation systems, effluent monitoring, and new outfall.

Non-Grease Trap Waste DAF Project
Environmental Remedies – Atlanta, Georgia
Project Manager and Engineer for process mechanical design of a DAF-based waste treatment system including unloading station and storage tanks.

Wastewater Lagoon Building Design
General Mills – Belvidere, Illinois
Designed a building to enclose an existing wastewater lagoon. The existing building was close to failure. The wastewater entered the building at 85-90°F which resulted in significant evaporation and re-condensation of corrosive wastewater on the building structure and infrastructure. The building design included HVAC design to minimize evaporation and building structure and surface protection to minimize condensation-related damage.

Water Filter Modification Design
General Mills – Belvidere, Illinois
Completed piping design for the addition of a second water filter within in an existing facility. We developed a 3-D model of the room's exiting geometry and contents and used the model to work with the client to evaluate multiple equipment locations and piping routes to best meet their construction and operational needs. The model was used to develop construction drawings.

Sewer Modification Design
General Mills – Belvidere, Illinois
Designed modifications to existing process and sanitary sewer systems to redirect water softener regeneration water and boiler blowdown water from the process sewer system to the sanitary sewer system. The designed included piping design, flow monitoring station design, excavation/trenching requirements, and restoration requirements.

Dissolved Air Filtration (DAF) Installation Cost Estimate
General Mills – Belvidere, Illinois
Developed a cost estimate to purchase and install a DAF-based wastewater treatment system.

Drinking Water Filling Station Installation Design
Woosh Water – Miami Beach, Florida
Developed permit and construction drawings and specifications for installing 25 drinking water filling stations throughout Miami Beach, Florida. Work included foundation design, developing water supply and electrical power requirements, and developing code and local-ordinance required restoration drawings and specifications.

Sludge Dewatering System
City of Mt. Vernon – Mt. Vernon, Illinois
Engineering manager responsible for mechanical/piping design, electrical design, and lighting design for a centrifuge-based sludge dewatering and conveyance system.

pH Adjustment System Design
Coca-Cola Refreshments – Houston, Texas
Completed process, mechanical, civil, structural, plumbing, and HVAC design for a wastewater pH adjustment system and associate building at a bottling facility. The design consisted of a lift station, oil-water separator, transfer pumps, two wastewater equalization/pH adjustment tanks, discharge control and monitoring system, chemical feed system, and control and storage building. ACEng served as the engineering partner in a design-build team to design and install the system.

Oil/Water Separator Installation Design
Coca-Cola Refreshments – Harahan, Louisiana
Developed installation drawings for an in ground oil/water separator for a bottling facility.

Wastewater Pretreatment System Equalization Tanks
Rich Products Corporation – Niles, Illinois
Project Manager for the design and construction of two 25,000-gallon wastewater equalization tanks for equalization process wastewater prior to treatment by a dissolved air flotation unit. The system included the two tanks, pumping systems, instrumentation, and cast-in-place concrete secondary containment structure with sump.

Wastewater Treatment System
PepsiAmericas – Riviera Beach, Florida
Project Manager for design-build of an industrial wastewater treatment system for pH adjustment of various wastewater steams. The system contained a duplex lift station, two pH adjustment tanks, chemical storage and delivery systems, and required mechanical, electrical, and control systems. The pH adjustment system's PLC and data management system was also integrated into the plant's production PLC for integrated operation, monitoring, and data management.

Wastewater Management Evaluation
PepsiAmericas – Lima, Ohio
Evaluated plant operations that generate wastewater and identified potential equipment and operations changes to decrease the frequency and duration of high and low pH wastewater discharges and worked with PepsiAmericas to present the proposed modifications to the POTW.

Wastewater Treatment System
PepsiAmericas – Austin, Indiana
Project Manager for evaluation of potential options for wastewater pH control at PepsiAmericas Austin, IN facility and conceptual design and cost estimate for the selected option.

Wastewater Treatment System
PepsiAmericas, Inc. – Twinsburg, Ohio
Engineering Manager for design of a $600K industrial wastewater treatment system for oil removal and pH adjustment of various wastewater steams. The system consisted of a debris-removal screen, 10,000-gallon oil/water separator, two 15,000-gallon pH adjustment tanks, chemical storage and delivery systems, and required mechanical, electrical, and control systems.

Wastewater Treatment System
Pepsi Cola General Bottlers, Inc. – Cincinnati, Ohio
Technical reviewer for design-build of an industrial wastewater pretreatment system for pH adjustment of various wastewater steams. Provided technical review and assistance in developing the process flow diagram, instrumentation and controls plan, the hydraulic profile, and equipment cut sheets. Mr. Adams also provided additional guidance during the conceptual design stages and was responsible for all foundation design.

Wastewater Treatment Alternatives Evaluation
Sara Lee – Traverse City, Michigan
Engineer for identification and evaluation both short-term and long-term system improvements that would increase the BOD and solids removal efficiency of the treatment system along with the system's hydraulic capacity.

Wastewater Treatment System Assessment
Sara Lee - Tupelo, Mississippi
Project Manager for assessing the performance of the existing wastewater treatment system, identifying information needs for system improvements to improve oil and grease removal and enhanced BOD removal, and developing a strategy to negotiate industrial wastewater discharge requirements with the City of Tupelo.

WWTP Effluent Storage
Bakken Development Group – Williston, North Dakota
Project Engineer for evaluating treatment and storage options for treated residential sanitary waste from a residential development. The design included pumping system, force main, and effluent storage lagoon.

Frack Water Treatment System
Confidential Client – North Dakota
Provided design assistance to Wenck Associates for design of a wastewater treatment system to treat Stage 1 and Stage 3 drilling fluids from fracking operations. Specific tasks included reviewing and finalizing P&IDs, developing project specifications, selecting pumps and instruments, and developing piping plans.

Domestic Wastewater Treatment System
Confidential Client – North Dakota
Provided design assistance to Wenck Associates for design of a wastewater treatment system to treat domestic/sanitary wastewater from fracking operations. Specific tasks included reviewing P&IDs, developing project specifications, selecting instruments, and developing piping plans.

Leachate Treatment System
Waste Management – Zeeland, Michigan
Project Manager for the design and construction of a leachate treatment system for arsenic removal at Waste Management's Autumn Hills Landfill. The system consisted of a duplex lift station; reaction tanks; a Lamella Clarifier; sludge transfer and storage system; chemical delivery systems for hydrogen peroxide, ferric sulfate, and polymer, electrical power distribution, PLC-based control system, required mechanical systems, and building with HVAC system.

Leachate Storage Tank
Waste Management – Jay County, Indiana
Project Manager for the design and construction support of a 150,000-gallon leachate storage tank including foundation design, secondary containment system design, and pumping systems. The Storage tank was designed to be modified to serve as a sequencing batch reactor (SBR) at a future date.

Wastewater Treatment System Permit Assistance
Waste Management CID Recycling and Disposal Facility – Calumet City, Illinois
Provided design support and permitting assistance for a new anaerobic digester for waste activated sludge from the facility's aerobic treatment tanks.

Wastewater Treatment System Permit Assistance
Waste Management CID Recycling and Disposal Facility – Calumet City, Illinois
Developed Engineering Report to support permit applications for expansion of an existing Central Waste Treatment (CWT) Facility. The expansion included re-permitting previously closed equipment, repurposing existing equipment by concerting a former anaerobic digester to an aerobic treatment tank, and adding new equipment.

Ash Sluice Water Supply System Evaluation
Alliant Energy - Marshalltown, Iowa
Lead Engineer responsible for conceptual design and cost estimate for reusing wastewater from on-site settling ponds for sluicing boilers. Conceptual design consisted of headworks, a duplex vertical turbine pumping system, piping with heat trace and insulation, filtration, and electrical power distribution and protection.

Solids Dewatering System
Alliant Energy – Ottumwa, Iowa
Engineering Manager for design of a solids dewatering system. The system consisted of an influent lift station, sludge holding tank, two plate and frame filter presses with feed pump, cloth washer, and acid wash system, compressed air system, electrical power distribution, PLC-based control system, required piping/mechanical systems, and building with HVAC system.

Dirty Industrial Wastewater Treatment System
ArcelorMittal – East Chicago, Indiana
Lead process engineer for design of a wastewater treatment system to remove solids and fats, oils, and grease (FOG) from recycled process water for steel manufacturing operations. System consisted of a circular clarifier, equalization tank with rope skimmer, flash mix tank, dissolved air flotation units, pumping systems, chemical feed systems, FOG and solids handling systems, instrumentation and control, and HVAC.

Wastewater Reuse Business Case
Canadian National Railroad - Homewood, Illinois
Project manager for evaluating the capacity of an existing wastewater treatment system and required modification to treat wastewater for reuse in a locomotive laundry. Mr. Adams also developed an Operations and Maintenance Manual for the existing treatment system to serve as a single document containing the system operating description, monitoring requirements, maintenance recommendations, and spare parts inventory.

Wastewater Treatment System Upgrades
Canadian National Railroad – Memphis, Tennessee
Project Manager to evaluate, design, construct, and integrate a biomass mitigation system to prevent the formation of an unwanted biomass at a wastewater treatment system in CN's Johnston Yard in Memphis, Tennessee.

Locomotive Laundry Design
Canadian National Railroad - Homewood, Illinois
Project manager for design of two locomotive laundry systems. Including water storage tanks, feed pumps, soap feed systems, spray loops, wash water collection systems, electrical power distribution systems, and control systems.

Wastewater Treatment System Assessment
Canadian National Railroad - Homewood, Illinois
Conducted inspection of an existing wastewater treatment system to document current components and conditions and developed an updated Operations and Maintenance Manual.

Coal Pile Runoff Treatment System
Alliant Energy – Ottumwa, IA
Project Manager for HVAC and electrical design of a coal pile runoff treatment system for a coal-fired power plant. Provided full-time construction oversight and served as owner's engineer during construction.

Storm Water / Wastewater Upgrades / Fueling System Upgrades / Remediation
Canadian National Railroad – Gladstone, Michigan
Project Manager for the design and construction of upgrades to the yard's stormwater system and locomotive fueling system and excavation, collection, and disposal of petroleum-impacted soil and groundwater.

Storm Water / Wastewater Upgrades
Canadian National Railroad – North Fond du Lac, Wisconsin
Project Manager for the design and construction of upgrades to the yard's stormwater system, sanitary sewer system, and fuel unloading system.

Outfall Ditch Modifications
Canadian National Railroad – Memphis, Tennessee
Project Engineer for the design of improvements to a stormwater outfall flow control ditch to minimize standing water during dry periods. Improvements included regarding the ditch to improve drainage to the outfall, replacing the HDPE liner, and changing inverts of the outfall structures.

Storm Water / Wastewater Upgrades
Canadian National Railroad – Proctor, Minnesota
Project Engineer responsible for identifying necessary improvements to the Yard's stormwater sewer system, sanitary sewer system, surface water management, and locomotive and truck wash systems, identifying corrective alternatives, and recommending the most technically and cost effective option (a total of 25 in all).

Storm Water / Wastewater Upgrades
Canadian National Railroad – P&C Docks, Conneaut, Ohio
Project Manager for the design and construction of improvements to the Dock's stormwater sewer system, stormwater treatment system, and surface water management system.

Wastewater Pretreatment System
Union Tank Car Company – Marion, Ohio
Project engineer for design-build of a $1M industrial wastewater pretreatment plant to treat oily, solids-laden wastes. Developed design drawings and calculations, reviewed equipment shop drawings, assisted in procurement of process and control equipment, obtained building permit, and provided engineering support during construction. The system had a design flow rate of 100 gpm, with processes including pH adjustment, phase separation, flocculation, clarification, and filtration.

Wastewater Treatment System
Confidential Client – Aurora, Illinois
Project Manager for wastewater characterization, evaluation of two existing pretreatment systems, wastewater pretreatment feasibility study, and design of a wastewater pretreatment system at three facilities for a confidential client. Based on the wastewater characterization data, pretreatment of nickel and pH buffering and neutralization were initially considered. However during review of the Client's facility expansion plans, Mr. Adams determined that, based on projected process discharges, removal of nickel would be required for several years thereby saving the Client approximately $400K in 2001. The

designed wastewater pretreatment system consisted of equalization, pH buffering, pH adjustment and surge holding.

Wastewater Treatment Alternatives Evaluation
Encana Corporation – Rifle, Colorado
Engineering Manager for a technology evaluation for treatment and reuse of 20,000 barrels per day of wastewater at a petroleum drilling and refining facility. The most applicable technologies evaluated included dissolved air flotation, Superator, gravity phase separation by API separator, membrane filtration, ion exchange, rapid spray evaporation.

Boiler Feed Water Treatment System
Citgo Refinery – Lemont, Illinois
Design engineer responsible mechanical and electrical design support and coordination, specifications, and design quality assurance for a boiler feed water system.

Full-Scale Pilot Water Treatment System
Premcor Refinery, Delaware City Refinery – Delaware City, Delaware
Engineer responsible for mechanical, instrumentation and controls, electrical, and civil design and process quality assurance for design-build-operation of a full-scale water treatment pilot system to treat leachate from an industrial landfill. The system consisted of process tanks, chemical delivery systems, lamella clarifier for precipitation of vanadium, a filter press and associated mechanical and instrumentation systems.

Temporary Water Reclaim System
Apache Nitrogen - Benson, Arizona
Project Manager for design and procurement assistance for a temporary water pretreatment system to treat boiler blowdown for reuse at the site. The system consisted of chemical feed systems, clarifier, multi-media filters, and solids handling/storage system. The system consisted of new, used and rental components and needed to be operational within a few months of a notice to proceed.

Wastewater Treatment System Expansion
Honda Transmission Manufacturing
Engineering and Construction Manager for Nalco Industrial Outsourcing for design and construction for expansion of a wastewater pretreatment system. System consisted of solids and oil and grease removal using bag filters, oil water separator, ultrafiltration, and granular activated carbon.

Wastewater Pretreatment System Assessment
Confidential Defense Contractor – USA
Project Manager for an industrial wastewater pretreatment system assessment to support the corporation's legal counsel in litigation support. The objectives of the project were to determine if the system was constructed and operated per applicable permits and design, and recommend system modifications and best management practices for system optimization and permit conformance.

In-Line pH Adjustment System
AAR – Goldsboro, North Carolina
Project Manager for evaluating pH adjustment alternatives and developing a preliminary design for a system to treat wastewater generated from a metal's finishing dipping process.

Wastewater Pretreatment System Operations Transfer
GE Transportation System – Grove City, Pennsylvania
Project Engineer for technical and management support for transition of an existing industrial wastewater pretreatment system for the existing operational service provider. Established contractual performance criteria, process monitoring procedures, and developed an Implementation Plan to guide the transfer of services.

Wastewater Treatment System
Bridgestone/Firestone Off-Road Tire Company – Bloomington, Illinois
Project manager for wastewater characterization and design-build of a pH adjustment system to neutralize the plant's effluent streams to comply with the POTW effluent limits. During the design phase, Mr. Adams identified an alternative system option that would treat more waste streams and require less facility floor space than the originally proposed system.

Water Treatment System
Westinghouse Electric Company, LLC – Hematite, Missouri
Developed instrument and control system specifications and functional control description for a groundwater treatment system.

Groundwater Treatment System Upgrades
American Chemical Services NPL Site – Griffith, Indiana
Responsible for engineering components for the design-build of a $2M groundwater pump and treat system upgrade to treat contaminated groundwater at an operating solvent manufacturing facility. Mr. Adams participated in a full-scale pilot study, developed design drawings and calculations, reviewed equipment shop drawings, assisted in procurement of process and control equipment, and provided engineering support during construction. The upgrades included adding an activated sludge system, aeration tank, gravity phase separator, organic sludge handling system, and increasing the maximum system flowrate. The upgrades had to be completed without disrupting treatment operations. Responsible for engineering support for operation of the treatment system including trouble shooting and compliance reporting.

Full-Scale Pilot Sediment Treatment System
Biogenesis, New Jersey Full-Scale Pilot System – New Jersey
Engineer responsible for design of a water treatment system to treat contaminant and sediment-laden wash water from a soil washing operation. The project was being conducted to confirm the effectiveness of the soil washing procedure and further evaluate treatment alternatives for the wash water prior to construction of a permanent system. The objectives of the water treatment component were to remove sediment from the water stream for reuse separately from the metals-contaminated sludge, confirm the effectiveness of the selected treatment process, and test alternative treatment technologies. The water system was designed to treat water containing 5-percent solids and various metals and organic contaminants and consisted of process tanks, chemical delivery systems, centrifuge, settling vessels, sand filters, granular activated carbon units, filter press, and associated mechanical and instrumentation systems.

RENEWABLE ENERGY (INCLUDING BIOGAS AND LANDFILL GAS)

Landfill Gas to Energy Facility
Waste Management Renewable Energy – Multiple Sites
Project Engineer process and mechanical design for multiple landfill-gas-energy facilities (LFGTE). Work included developing P&IDs, piping design, and engine room ventilation design. Site included:

- Novato, CA – 3.9 MW electrical generation facility (two Caterpillar 3520 1500 RPM engine-generators). The system included a Sulfatreat-based H_2S removal system, a regenerative siloxanes removal system, and emissions control systems.
- Surprise, AZ – 3.2 MW electrical generation facility (two Caterpillar 3520 engine-generators).
- Herkimer, NY – 3.2 MW electrical generation facility (two Caterpillar 3520 engine-generators).
- East St. Louis, IL – 5.6 MW electrical generation facility (three Caterpillar 3520 and one Caterpillar 3516 engine-generators).
- Geneva, OH – 4.0 MW electrical generation facility (five Caterpillar 3516 engine-generators).
- New Springfield, OH – 4.8 MW electrical generation facility (six Caterpillar 3516 engine-generators).
- Arlington, Oregon – 6.4 MW electrical generation facility (three Caterpillar 3520 engine-generators).

Anaerobic Digester Project
Green Era Sustainability – Chicago, Illinois
Project Manager for design of an anaerobic digester facility to receive and process organic food wastes to Class A biosolids and RNG. The system consisted of liquid unloading stations, product de-packaging equipment, anaerobic digestor, biosolids dewatering and disinfection system, biogas boilers for process and building heat, biogas conditioning skid for RNG, flares, associated mechanical systems. Work completed by Mr. Adams included the process mechanical design and building HVAC design as well as managing the structural, plumbing, fire protection, and electrical design.

Manure Mass and Energy Balance
Settje Agri-Services & Engineering, Inc. – Confidential, Nebraska
Developed a mass and energy balance for a proposed anaerobic digester system at beef feedlot. Utilized manure and owner operational data as well as climatic data to calculate manure and digester heating requirements, expected fuel consumption, and associated boiler sizing for the project. Monthly scenarios were evaluated as well as an annual average.

Operations Support and Systems Upgrade Design – Anaerobic Digester
Jerome Resources – Confidential Dairy, Idaho
Project manager to support operations of an existing dairy digester. Work has included development of a mass and energy balance for the operation, design of a centrifuge-based solids removal system from digestate, design and scope development for maintenance and improvement tasks.

Preliminary Design and Engineering Support – Anaerobic Digester
Jerome Resources – Confidential Dairy, Kansas
Developed basis of design, mass and energy balance, 30% design drawing set, structural design for temporary manure solids removal system.

Preliminary Design and Engineering Support – Anaerobic Digester
Jerome Resources – Confidential Dairy, Idaho
Developed basis of design, P&ID, mass and energy balance, 30% design drawing set for an anaerobic digestion and RNG system at a dairy.

Feasibility Evaluation – Anaerobic Digester
Jerome Resources – Confidential Dairy, Idaho
Performed expected manure and biogas generation evaluation and mass & energy balance for client to evaluate feasibility of an anaerobic digestion system at a dairy.

Preliminary Design and Engineering Support – Anaerobic Digester
Confidential Client – Cactus, Texas
Engineer for conceptual design of a digester and biogas conditioning system for a meat processor. Specific tasks included development of project drawings, design of feedstock handling systems, developing an opinion of probable cost for potential investors, and technical review of design documents completed by others.

Opportunity Evaluation – Anaerobic Digesters
South Pointe Partners – Confidential Dairy, Idaho
Performed expected manure and biogas generation evaluation and mass & energy balance for two anaerobic digestion systems serving two diaries with a common high BTU system for RNG pipeline injection.

Dovetail Energy Capital Improvement Project
Renergy, Inc. – Fairborn, Ohio
Provided technical review of Process Flow Diagram and Piping & Instrumentation Diagram and lead engineer for project civil and structural design. The expansion included increasing food waste handling and digestion capacity, improving biomass disinfection system to achieve Class A biosolids, upgraded biogas compression and conditioning system, and additional CAT 3516 generators.

Emerald Bioenergy Capital Improvement Project
Renergy, Inc. – Cardington, Ohio
Reviewed design documentation and Permit to Install application.

Hydraulic Assessment – T&W RNG Generation Facility
SustainRNG – Eatonton, Georgia
Hydraulically model manure pumping systems to aid in operations optimization at an existing dairy manure-to-RNG facility.

Dairy Manure Mass and Energy Balance
SustainRNG – Multiple Dairies
Developed a mass and energy balance for a proposed anaerobic digester system at a dairy farm. Utilized manure and owner operational data as well as climatic data to calculate manure and digester heating requirements, expected fuel consumption, and associated boiler sizing for the project. Monthly scenarios were evaluated as well as an annual average. Dairies included:

- Milco Dairy, Lewisville, Indiana
- County Line Dairy, Lewisville, Indiana
- Sun Mountain Dairy, New Bavaria, Ohio
- Mountain View Farms, Chathan, Virginia
- Beam Dairy, Cherryville, North Carolina

Conceptual Dairy Manure-to RNG System Design
SustainRNG – Multiple Dairies
Developed conceptual design documents for a Dairy Manure-to RNG. Documents consisted of seasonal heat and mass balance, project specifications, piping & instrumentation diagram (P&ID), process equipment and pump schedule, expected electrical load summary, pipe insulation schedule, hand valve schedule, actuated valve schedule, instrument schedule, vessel schedule, and line specialties schedule. Dairies included:

- Pecan Grove Dairies, Baconton, Georgia
- Harmony Grove Dairies, Waynesboro, Georgia
- Barrington Dairies, Montezuma, Georgia

Opportunity Development – Anaerobic Digester
Jerome Resources – Multiple Dairies
Performed expected manure and biogas generation evaluation, mass & energy balance, and preliminary site layout for an anaerobic digestion system at a dairy. Locations included:

- Confidential Dairy, Idaho
- Confidential Dairy, Idaho
- Confidential Dairy, Iowa

Hydraulic Assessment and Modifications Design – Liberty RNG Generation Facility
SustainRNG – Liberty North Carolina
Hydraulically model manure pumping systems to aid in operations optimization at an existing dairy manure-to-RNG facility and developed design documents for system recommended and requested improvements.

Engineering and Inspection Services
ampCNG – Fair Oaks, Indiana
Evaluated an existing biogas compression and dehumidification system and provide recommendations to improve system performance.

Emerald Bioenergy Capital Improvement Project
Renergy, Inc. – Cardington, Ohio
Reviewed shop drawings for a PSA-based biogas conditioning system to treat 400 SCFM of biogas to local pipeline standards.

Wastewater Biogas System Modifications
Confidential Food Distribution Center – Compton, California
Project Manager for design and manufacture of a biogas compression and condition skid to compress biogas from an anaerobic digester and feed it to microturbines and existing boilers. Project also included manufacturer of a biogas/natural gas blending skid and modifications to the control systems for two existing boilers so that the boilers could operate using biogas and natural gas blends of varying BTU content.

Wastewater Biogas System Modifications
American Crystal Sugar – East Grand Forks, Minnesota
Lead Engineer for evaluation and preliminary design of biogas handling system modifications for an existing wastewater treatment and biogas handling system. Objectives of modifications were remove condensate and foam from biogas piping and components and increase biogas handling capacity for a covered pond and anaerobic digester.

Biogas Usage Evaluation
Linden WWTP Digester – Genesee Co., Michigan
Project Manager for evaluation potential options for beneficial reuse of biogas generated from a municipal anaerobic digester.

Biogas Flare Evaluation Support
Confidential Brewery - Pennsylvania
Project Manager to evaluate digester biogas generation and current enclosed flare performance. The flare's construction and design parameters were compared to actual biogas quality and quantity produced to identify solutions for improved flare performance and emissions compliance.

Biogas Flare Replacement
Confidential Brewery - Wisconsin
Project Manager to develop flare specifications, solicit request for quotations, evaluate quotes for compliance with the specifications and project emissions requirements. Developed a process diagram and mass and energy balance for the biogas compression and conditioning system.

American Organic Energy
Green Arrow Engineering – Long Island, New York
Provided technical of biogas compression and conditioning skid request for quotation and hazardous area classification memorandum.

Landfill Gas Treatment Pilot
Waste Management – Zeeland, Michigan
Project Manager for identifying technologies to remove hydrogen sulfide (H_2S) from landfill gas and pilot testing select technologies. Technologies evaluated included iron sponge, caustic scrubbing, and amine scrubbing. Caustic scrubbing and amine scrubbing were pilot tested.

Industrial Infrastructure & Equipment

P&ID Development for Cooling Water System
Steel Mill - Ghent, Kentucky
Conducted field inspection and data gathering of a non-contact cooling water system for a steel mill and developed current P&IDs of the system.

Hydraulic Model Development for Cooling Water System
Steel Mill - Ghent, Kentucky
Developed a P&ID and a Hydraulic Model of the mills Direct Cooling Water (DCW), Indirect Cooling Water (ICW) and Make-Up Water systems. The model was developed in Pipe-Flo Professional and utilized an active Microsoft Excel interface to allows the owner to import production parameters into the model and receive Excel-based system performance reports for pumping systems, cooling tower performance, and make-up water requirements.

#3 & #4 Blast Furnace Recycle System Evaluation
ArcelorMittal – East Chicago, Indiana
Project Manager for evaluation of a process water recycle system for blast furnace scrubber water and Sinter Plant operations. Scope consisted of confirming the accuracy of existing flow meters, identifying sources of influent water to the recycle system loop, evaluation of discharges from the recycle system loop, and developing a preliminary water balance.

Gas Cleaning Blowdown Automation
ArcelorMittal – East Chicago, Indiana
Lead engineer for design of a controls system upgrade for a water management system for various operations. Design of flow metering and control plan including construction details, PLC and control panel design, and electrical power and signal/control signal distribution.

3 CAL Closed-Loop Water Quench System
ArcelorMittal – East Chicago, Indiana
Project Engineer for design of an automated closed-loop cooling tower-based cooling system to improve quench water quality and subsequently improve product quality operational up time and increase production.

Cooling Water Supply Pipe Reroute, #5 & #6 Blast Furnaces
ArcelorMittal – East Chicago, Indiana
Project Engineer responsible for developing work scope documents for cooling water supply pipe reroute for the No. 5 and No. 6 Blast Furnaces. Work included replacing pipes and tie-ins, tapping into existing piping, and modifying the service ramp to allow for the new routing.

Strainer Upgrades, 80-Inch Hot Strip Mill
ArcelorMittal – East Chicago, Indiana
Project Manager for design of a duplex oil strainer system at the 80-Inch Hot Strip Mill including mechanical and structural support modifications.

#2 Pump House Pump Auto Prime Project
ArcelorMittal – East Chicago, Indiana
Lead Engineer for converting a manual pump priming system to an automatic pump priming system for ArcelorMittal's #1 Service Pump.

Oil & Grease Removal Evaluation, No. 3 Hot Strip Mill WWTP
ArcelorMittal – East Chicago, Indiana
Lead Engineer for evaluating methods to improve oil & grease removal and collection at an existing wastewater treatment plant. Recommendation included a multi-stage approach for modifying an existing 75-foot diameter clarifier and its oil & grease handling systems.

6-Inch Boiler Feed Water Pipe Reroute
ArcelorMittal – East Chicago, Indiana
Project Manager for evaluating rerouting options for a 6-inch boiler feed water pipe and a 16-inch steam pipe to maximize the quantity of buildings and pipe supports for the pipes can be demolished and completing the design for the rerouted piping sections.

Boiler Feed Water Treatment Options Evaluation for No. 2AC Station
ArcelorMittal – East Chicago, Indiana
Project Manager for evaluating treatment options to improve the capacity and water quality of an existing softener-based boiler feed water treatment system.

Steam Heat Skid for RO Feed Water
ArcelorMittal – East Chicago, Indiana
Project Manager for design and manufacturing of a skid to pre-heat water from Lake Michigan to feed RO units for plant use. The skid included direct steam injection heaters.

Steam Heat Skid for Process Water
ArcelorMittal – East Chicago, Indiana
Project Manager for design and manufacturing of a skid to heat softened water for freeze protection at ArcelorMittal's #3 Steel Producing Operations. The skid included direct steam injection heaters.

Pump Skid for Process Water
ArcelorMittal – East Chicago, Indiana
Project Manager for design and manufacturing of a pump skid to pump process water for ArcelorMittal's #3 Steel Producing Operations. The skid included direct steam injection heaters.

Diesel Injection Skids
Technip USA – Koniambo, New Caledonia
Project Manager and Engineer for design and manufacturing of two diesel injection skids to support mining operations at a nickel mine being constructed in New Caledonia. Project complied with European Directives (CE/ATEX).

Diesel Injector Guns
Technip USA – Koniambo, New Caledonia
Project Manager and Engineer for design and manufacturing of twenty-five diesel injector guns to support mining operations at a nickel mine being constructed in New Caledonia. Project complied with European Directives (CE/ATEX).

Ammonia Injection Skids
Riley Power – Hoosier Energy, Merom, Indiana
Project Manager and Engineer for design and manufacturing of two anhydrous ammonia injection skids for air emissions treatment at a coal-fired power plant.

Steam Trap Skids
Riley Power – Duke Energy, Cayuga, Indiana
Project Manager and Engineer for design and manufacturing of four steam trap skids for a power plant in Indiana.

Ammonia Injection Skids
Riley Power – TVA, Gallatin, Tennessee
Project Manager and Engineer for design and manufacturing of four anhydrous ammonia injection skids for air emissions treatment at a coal-fired power plant.

Ammonia Dilution Air Blower, Vaporizer, and Injections Skids
Hitachi Power – Westar SCR, St. Mary's, Kansas
Project Engineer for design and manufacturing of an anhydrous ammonia vaporizer and injection skid and a dilution air blower skid for a power plant.

Ammonia Pump Skid, Truck Transfer Skid, and Vaporizer and Injections Skids
Babcock and Wilcox, West Palm Beach, Florida
Project Engineer for design and manufacturing of four anhydrous truck unloading skids, pump skids, and vaporizer/injection skids for a solid waste processing facility.

Process Ventilation & HVAC

MEP Design – Electrical Building
Shamrock Environmental Corporation (Republic Services) – Mulberry, Florida
Designed cooling and ventilation systems for an electrical and control room for a waste treatment facility.

MEP Design – Employee Break Room Building
Shamrock Environmental Corporation (Republic Services) – Mulberry, Florida
Designed HVAC and plumbing systems for a building containing an employee break room, multiple restrooms, mulyiple shower rooms, multiple locker room, and an electrical room.

MEP Design – Lab Building
Shamrock Environmental Corporation (Republic Services) – Mulberry, Florida
Designed HVAC and plumbing systems for a building containing an laboratory with fume hood, employee breakroom, restroom, and storage room.

Landfill Gas to Energy Facility
SCS Energy – Multiple Sites
Project Manager for Process HVAC design for a Landfill Gas to Energy Facility (RNG) at the following facilities:

- Skyline Landfill, Ferris, Texas
- Southside Landfill, Indianapolis, Indiana
- Outer Loop RDF, Louisville, Kentucky
- Wood Street Landfill, Lansing, Michigan
- Noble Road Landfill, Shiloh, Ohio
- Pine Bend, Inver Grove Heights, Minnesota
- Prairie View Landfill, Wilmington, Illinois
- New River, Raiford, Florida
- Eco-Vista Landfill, Springdale, Arkansas
- Carbon Limestone Sanitary Landfill, Lowellville, Ohio
- Lorain County Landfill, Oberlin, Ohio
- Prince William Landfill, Manassas, Virginia
- Arbor Hills Landfill, Northville, Michigan
- Fairless Landfill, Morrisville, Pennsylvania
- DFW Landfill, Lewisville, Texas
- Orchard Hills Landfill, Davis Junction, Illinois
- Sampson County Landfill (Sapphire RNG), Roseboro, North Carolina
- Ridge Landfill, Blenheim, Ontario, Canada
- Okeechobee Landfill, Okeechobee, Florida
- Security Landfill, Cleveland, Texas
- Temple Landfill, Temple, Texas
- Williamson County Landfill, Hutto, Texas
- Dekalb County Landfill, Dekalb, Illinois
- Medley Landfill, Medley, Florida
- Covel Gardens Landfill, San Antonio, Texas
- Polk County, Winter Haven, Florida
- Richland Landfill, Elgin, South Carolina
- Oakridge Landfill, Dorchester, South Carolina
- Columbia Ridge Landfill, Arlington, Oregon

- High Acres Landfill, Fairport, New York
- Ocean County Landfill, Manchester, New Jersey
- Salem Waste Disposal Center, Opelika, Alabama
- Atlantic County Utilities Authority Landfill, Egg Harbor Township, New Jersey
- Pheasant Point Landfill, Bennington, Nebraska
- Brevard Landfill, Cocoa, Florida
- Pecan Grove Landfill, Pass Christian, Mississippi
- Pine Bluff Landfill, Ball Ground, Georgia
- Elk River Landfill, Elk River, Minnesota
- Dry Creek Landfill, Eagle Point, Oregon
- Cottonwood Landfill, Marissa, Illinois
- American Avenue Landfill, Kerman, California
- Denver Arapahoe Disposal (DADs), Aurora, Colorado

WWPTS Building HVAC, Confidential Site
Complete Water Services, LLC – Taylorsville, Indiana
Designed ventilation and heating systems for multiple process-related rooms as well and mechanical cooling systems for an office space and electrical room.

WWPTS Building HVAC, Dyma Brands
Complete Water Services, LLC – Bremen, Georgia
Designed ventilation and heating systems for a wastewater pretreatment building.

WWPTS Building HVAC, UTLX
Complete Water Services, LLC – Cleveland, Texas
Designed ventilation and heating systems for a chemical storage and feed room as well and mechanical cooling systems for an office space and electrical room.

Renewable Natural Gas Project
Waste Management Renewable Energy – Skyline Landfill, Ferris, Texas
Designed process room ventilation system for a landfill gas to renewable natural gas (RNG) facility.

STRUCTURAL DESIGN AND ANALYSIS

Structural Assessment for Pilot Facility
Blue Ridge Aquaculture – Martinsville, Virginia
Project manager and reviewer for structural assessment of existing infrastructure that was to be repurposed. Provided recommendations for structural-related modifications.

Foundation Design – Remedial Action
American Chemical Services NPL Site – Griffith, Indiana
Designed reinforced concrete and aggregate foundations for a groundwater treatment plant expansion at the ACS Site. As part of this project, Mr. Adams designed the concrete floor, the wall foundations, and all of the spread footings for the building columns. He designed the spread footings for a 38,000-gallon gravity phase separation supported on four legs, and designed and oversaw the construction of the foundation for a 56.5-foot diameter, 420,000-gallon activated sludge plant. Mr. Adams also designed an aggregate foundation for a 36,000-gallon rectangular tank.

Foundation Design – Wastewater Pretreatment System
Union Tank Car Company – Marion, Ohio
Designed reinforced concrete and aggregate foundations for this wastewater treatment plant. As part of this project, Mr. Adams designed the concrete floor, the wall foundations, and all of the spread footings for the building columns of a 40-feet by 60-feet prefabricated building. He designed the spread footings for a 38,000-gallon gravity phase separation supported on four legs, a 15-foot diameter circular clarifier, and various smaller tanks and a mat foundation for a continuous backwash sand filter. Mr. Adams also designed aggregate foundations for a 100,000-gallon and a 50,000-gallon storage tank.

Foundation Design – Wastewater Pretreatment System
Pepsi Cola General Bottlers, Inc. – Cincinnati, Ohio
Evaluated foundation alternatives for one 15,000-gallon process tank and one 10,000-gallon process tank to be located inside a beverage manufacturing facility. Typical slabs or mat foundations were found infeasible due to poor soil conditions at the site and the client's construction requirements. Mr. Adams selected and designed a foundation consisting of helical piers and a concrete supporting pad. This foundation option was installed with minimal plant disturbance, within the clients shortened schedule, and saved the client approximately $40K over traditional foundation options.

Prefabricated Skid Structural Design
OGI Process Equipment, Multiple Equipment Installations, USA

- Completed equipment foundation reaction calculations and anchor bolt selection for water bath heater. Marshalltown, Iowa.
- Project and Quality Manager for foundation design for dust collector tower and water storage tank. Sand Springs, Oklahoma.
- Completed equipment foundation reaction calculations and anchor bolt selection for water bath heater. Yuma, Arizona.
- Project and Quality Manager for structural evaluation of exhaust stack connections on a water bath heaters installed at the following locations.
    - Libertyville, Illinois.
    - Defiance, Ohio.
    - Jena, Louisiana.
    - Sandyville, West Virginia.
    - Sandyville, West Virginia (different project).
    - Strasburg, Virginia.
    - Mansfield, Ohio.
    - Boldman, Kentucky.
    - Calumet County, Wisconsin.
    - Artemas, Pennsylvania.
    - Mount Olive, Kentucky.
    - Millersport Gill, Ohio.
    - Lawrence, Ohio.
    - Adell, Wisconsin.
    - Janesville, Wisconsin.
    - Weyauwega, Wisconsin.
    - Channahon, Illinois.
    - Jefferson Davis Parish, Louisiana.
    - Anergard, North Dakota

REMEDIATION & SOLIDS WASTE

Remedial Action
American Chemical Services NPL Site – Griffith, Indiana
Responsible for engineering components for the design-build of a four year, $23M remedial action at an operating chemical manufacturing/blending facility. The remedial action consists of upgrade and operation of an existing groundwater pump and treat system; installation of a subsurface bentonite slurry barrier wall; installation of three individual in-situ vapor extraction systems (SVE); removal, characterization, and disposal of approximately 1,200 buried drums; excavation and disposal of PCB-contaminated soil from a neighboring wetland; restoration of the wetland; and installation of two separate engineered cover systems to reduce stormwater infiltration and SVE short-circuiting.

Remedial Actions and Property Transfer
O'Hare Air Reserve Station – Chicago, Illinois
Project Manager for approximately $5.5M in supplemental remedial investigations, a base-wide feasibility study (covering 36 sites), groundwater classification, multiple removal actions, and property transfer document development for entire O'Hare Air Reserve Station (ARS), Chicago, Illinois to support closure and property transfer of the former ARS facility. Specific projects included excavation and disposal of approximately 8,500 cubic yards of TCE-contaminated soil, excavation and removal of approximately 1,000 cubic of PNA-contaminated soils from three separate sites, and investigation of 6,000 linear feet of sanitary sewer line consisting of video analysis, soil organic vapor survey, and soil sampling and analysis. The property is scheduled to be successfully transferred to the designated recipient in summer 2002. These work activities were completed under Air Force Center Environmental Excellence (AFCEE) FSRA and PA/RD contracts.

SVE, Air Sparge, and Groundwater Treatment
Plantation Pipeline Center Block Release Site – Hull, Georgia
Engineer responsible for design of processing components for design-build of a 91-well soil vapor extraction system (SVE), a 104-point air sparge system, and a groundwater pump-and-treat system. The compounds of concern were gasoline fuel-related compounds.

Groundwater Containment and Collection System
Kraft Foods, Inc. - Beaver Dam, Wisconsin
Managed all aspects of operations, maintenance, and monitoring of a groundwater containment system, collection system, and pretreatment facility at a former manufactured gas plant for two and one-half years.

Bioventing System
Advanced Environmental Technical Services - Alsip, Illinois
Provided field management and oversight of contractor for a bioventing treatment system for remediation of benzene soil contamination at a former hazardous materials temporary storage facility.

Groundwater Containment and Collection System
Caterpillar, Inc. – East Peoria, Illinois
Prepared cost estimates for construction of the Branch A Ditch shallow groundwater containment and collection system. Participated in design of the HDPE FML containment system. Performed field management and contractor oversight, acted as client site representative to the contractor, and performed and oversaw quality assurance sampling for construction of the Branch A Ditch containment system.

Site Remediation and Tank Closure
Former Fairbanks Morse Facility - East Moline, Illinois
Supervised excavation and off-site disposal of petroleum impacted soil, removal of one AST, and the removal of three USTs at the site to obtain a "No Further Action" letter from governing agencies.

Landfill Cover Extension and Maintenance
Wauconda Superfund Site - Wauconda, Illinois
Supervised contractor during construction of a landfill cap extension, drainage system, and waste consolidation at Wauconda Superfund Site. Inspections included verification of material thickness, compaction, grade, and cover material quality. Performed monthly inspections of landfill cover, leachate collection, storage and discharge system, and for off-site landfill gas migration

Landfill Delineation and Characterization
Four County Landfill - Fulton County, Indiana
Conducted waste delineation and cover material characterization at closed landfill. Work included oversight of excavation of 31 test pits to determine landfill extent and the thickness and composition of cover material for design of the landfill cap. Work was performed under direct IDEM oversight.

Landfill Cover Design
Fons/Old Wayne Landfills Site - Washtenaw County, Michigan
Performed drainage layer capacity, slope stability, and settlement calculations for 50% Design of a landfill cover system for both landfills at the site and modified above mentioned calculations in 95% Design to incorporate design changes.

MISCELLANEOUS

Process Line Decomissioning
Confidential Tool Manufacturer – Niles, Illinois
Supervised removal of Brite Dip and Immunizing Lines at a tool and small parts manufacturing plant in Niles, Illinois.

Emergency Lighting Upgrade
Kraft Foods – Chicago, Illinois
Project Engineer responsible for field location and identification of existing emergency lighting fixtures, egress lighting, emergency electrical panels, circuit identification, and conduit runs for Kraft's bakery in Chicago, Illinois.

EMPLOYMENT HISTORY

Owner & Principal; Adams & Christensen Engineering, Inc. – Batavia, IL (2013- Present)
Engineering Director - Services; Aether DBS/Hard Hat Services – Naperville, IL (2007-2013)
Senior Project Engineer; STS Consultants, Ltd. – Vernon Hills, IL (2005-2007)
Senior Engineer; Montgomery Watson/MWH Global – Chicago, IL (1998-2005)
Junior Engineer; Conestoga-Rovers and Associates – Chicago, IL (1995-1998)

EDUCATION

Bachelor of Science in Civil Engineering - Illinois Institute of Engineering, Chicago, Illinois