

KERIM TEMEL, PE



Education

ME - Environmental Engineering, City College of New York, 2011
BE - Mechanical Engineering, Gazi University, 2005

Professional Licenses

Professional Engineer –New Jersey (#24GE05615500)

Specialty Certifications

OSHA Health and Safety at Hazardous Waste Operations (HAZWOPER)
OSHA Hazardous Materials, Supervisor Training, 8-Hour
OSHA Construction Training, 10 Hours

Professional Affiliations

Water Environment Federation (WEF)
Virginia Water Environment Association (VWEA)

Professional Experience

Karim Temel is a Project Director with over 14 years of experience in municipal and industrial wastewater, leachate treatment, groundwater remediation, and Operations and Maintenance (O&M). He had significant experience treating complex wastewater such as those from landfill leachate (including removal of Perfluoroalkyl Substances [PFAS]), pharmaceuticals, and chemicals industries. His areas of experience include alternatives evaluations, planning and design, troubleshooting, characterization, treatability testing, confirmation testing, system evaluations, startup and training, and process design. Additionally, he has managed numerous biological and physical/chemical wastewater treatability and process design projects for pharmaceuticals and landfills.

Landfill Leachate Treatment

Sarasota County, FL, Leachate Treatment Alternatives Evaluation and Leachate Storage Tank Aeration System Design. Subject Matter Expert. Led project to evaluate leachate treatment alternatives for total nitrogen removal and design of a new aeration system for an existing leachate storage tank. Services included waste load development, alternatives evaluations, CAPEX cost estimate, report preparation, and detailed design of an aeration system.

Vermont, PFAS Removal Leachate Alternatives Evaluation Casella Waste Systems. Process Engineer. Evaluated, at a conceptual level, two on-site and two off-site treatment and pretreatment technologies for removal of per- and polyfluoroalkyl substances (PFAS) compounds at New England Waste Services of Vermont's (NEWSVT) landfill in Coventry, Vermont. In addition to an evaluation of benefits and limitations associated with particular disposal and technology alternatives, the results of a preliminary economic analysis of the on-site and off-site treatment and disposal options are included. The various technologies discussed were evaluated and selected based on commercial availability, proven treatment of leachate, and effectiveness at PFAS removal for application in each of the associated disposal options as part of conceptual integrated treatment systems.

Confidential Client. PFAS Removal Leachate Alternatives Evaluation. Lead Process Engineer.

Developed the design basis of a new leachate treatment plant (LTP), evaluated applicable technologies for PFAS removal, prepared applicable processes and process flow diagrams, performed financial analysis, and prepared technical memorandum.

Confidential Client. PFAS Removal Leachate Alternatives Evaluation and Bench Pilot Testing. Lead Process Engineer.

Provided engineering services for the design, construction, startup, operation, and data management of a pilot system to treat landfill leachate for the removal of Perfluoroalkyl substances (PFAS) compounds. Pilot system included biological treatment, ultra-filtration, nano-filtration, activated carbon, and reverse osmosis. The results from the pilot study were used to develop CAPEX, OPEX, and Life Cycle costs for the following four alternatives: 1) MBR + NF, 2) MBR + GAC, 3) MBR + NF + GAC, and 4) RO. Final deliverables for each alternative were PFDs, Plot plan, Major Equipment Lists, and Life Cycle Cost Analysis.

Henrico, VA, Old Dominion Landfill, Republic Services. Leachate Treatment Plant Design. Lead Process Engineer/Deputy DM.

Led the design of a new leachate physical-chemical pre-treatment plant for metals removal and sludge dewatering with a capacity of 200,000 gpd. Work includes alternatives analysis, treatability testing, process design, detailed design, and financial analysis.

Waverly, VA, Atlantic Landfill Waste Management. Leachate Treatment Plant Start-up and Commissioning. Lead Process Engineer.

Collaborated with the operations team to commission the Design-Build LTP. The LTP includes chemical metals precipitation/separation process, MBR, RO, Resin ammonia polishing system, RO concentrate reduction system, and dewatering system. The LTP was successfully commissioned and met the design and permit requirements.

Waverly, VA, Atlantic Landfill, Waste Management. Landfill Operation and Pre-Treatment Evaluation. Process Engineer.

Operated a 75,000-gallon-per-day landfill seep pre-treatment plant and evaluated the seep pre-treatment alternatives by incorporating Dissolved Air Flotation (DAF) unit as a solids/liquid separation. Conducted DAF and Gas Energy Mixing (GEM) pilot unit testing, including a chemical addition system, to determine the performance of the DAF and GEM on removing precipitated metals from landfill seep at the facility.

Johnston, RI, Confidential Client. Arsenic Removal Conceptual Design. Project Engineer

evaluated the best available technologies for arsenic removal for the treatment of process wastewater generated at the gas conditioning plant. The conceptual design package included a process major equipment list, operational cost estimate, and an AACE Class 5 cost estimate.

Emelle, AL, Waste Management. Leachate Treatment Plant Hazard and Operability (HAZOP) and Detailed Design Review.

Process Engineer worked with the design team to perform HAZOP and a detailed design review for leachate treatment plant. The outcome from HAZOP review was implemented in the detailed design.

Henrico, VA, Old Dominion Landfill, Republic Services. Leachate Treatment Plant Alternatives Evaluation.

Lead Process Engineer developed the design basis and evaluated the alternative technologies for the LTP. Performed biological leachate treatment modeling to identify the biological tank size. Prepared Class 5 cost estimate for the proposed LTP.

Henrico, VA, Old Dominion Landfill, Republic Services. Permitting Support.

Lead Process Engineer/Project Manager provided technical support throughout the permit renewal appeal and permit limits negotiation phase.

Apopka, FL, Vista Landfill, Waste Management. Membrane Bioreactor Modeling and Cost Estimate. Lead Process Engineer developed MBR biological model for the removal of Total Nitrogen, sized equipment, and developed capital and operational cost estimates.

San Diego County, CA, Otay Landfill, Republic Services. High Strength Leachate Treatability Testing. Project Manager/Process Engineer developed the anaerobic bench testing procedure for high-strength landfill leachate, coordinated with the testing lab, analyzed the data received from the testing lab, and summarized the findings.

Buford, GA, Richland Creek Landfill, Republic Services. Leachate Treatment Plant Upgrade Evaluation and Design. Lead Process Engineer developed the design basis of the LTP upgrades and evaluated the alternative technologies for the LTP upgrade. Assisted in the preparation of the permit application as well as the sewer capacity certification request form. Performed design calculations and prepared process and instrumentation diagrams for the LTP upgrades.

Morgantown, PA, Conestoga Landfill, Republic Services. Leachate Treatment Plant O&M Manual Revision. Process Engineer updated the pre-established O&M manual for the leachate treatment plant.

Waverly, VA, Atlantic Landfill, Waste Management. Leachate Treatment Plant O&M Manual Preparation. Process Engineer prepared the O&M Manual for the leachate treatment plant.

Lowellville, OH, Carbon Limestone Landfill, Republic Services. Leachate Treatment Plant Detailed Design Support. Lead Process Engineer reviewed the design concept and P&IDs. Prepared process control description. Provided technical feedback to process mechanical team. Reviewed contract specifications.

Canton, MI, Sauk Trail Hills Landfill, Republic Service. Leachate Treatment for Chemical Oxidation Demand (COD) Removal. Process Engineer evaluated simple aeration in a biologically active aerated tank configuration and chemical oxidation with hydrogen peroxide to remove COD to comply with local pre-treatment limits. Testing demonstrated that a 25% reduction in COD in winter conditions could be achieved with installation of a Venturi-type aerator. Using existing tank nozzles, the system could be economically installed in the existing leachate storage tank.

Waterloo, NY, Seneca Meadows Landfill, Seneca Meadows, Inc. Leachate Treatment Plant Evaluation. Lead Process Engineer evaluated the existing technology and recommended near-term modifications that could be implemented quickly and economically to improve treatment performance and operations.

Waverly, VA, Atlantic Landfill, Waste Management, Leachate Treatment Plant Evaluation. Lead Process Engineer performed the site-wide mass balance calculation for the LTP with a daily treatment capacity of 455,000 gallons. Prepared Process Performance Acceptance Testing summary tables and an LTP Start-up and Commissioning Plan, including identifying required temporary equipment during the early start-up phase (Biomass seeding, growth, and acclimation).

Confidential Client. Leachate Treatment Plant Evaluation. Process Engineer served as part of a multi-disciplinary design team responsible for the design of the preparation of the leachate characteristics (Basis of Design) and part of the conceptual Leachate Treatment Design team. Prepared process flow diagrams for alternative treatment systems and participated in preparation of leachate treatment alternatives evaluation technical memorandum.

Wellsboro, PA, Phoenix Resources Landfill, Waste Management. Leachate Treatment Evaluation.

Process Engineer evaluated best available technologies for managing and treating leachate from the landfill to achieve and maintain compliance with the State of Pennsylvania's leachate storage regulations. The evaluation focused on hydraulic evaluation, technologies available for the treatment of the leachate, the treatment performance (i.e., removals), O&M, and associated impacts if the technologies were employed.

Kane, PA, McKean Landfill, Casella. Leachate Treatment Reverse Osmosis System Evaluation.

Process Engineer evaluated RO system O&M procedures and overall performance. Identified key modifications/replacements that would likely improve the longevity of the RO system and its ability to meet compliance consistently and reliably. Conducted bench-scale tests that included evaluating the performance of RO modules (ammonia-N rejection rates), testing breakpoint chlorination for ammonia-N polishing, and conducting air stripping tests for ammonia-N polishing.

Pharmaceutical Water and Wastewater**Bridgewater, NJ, American Cyanamid. Groundwater Treatment Facility Design and Continued Support.**

Project Engineer performed a groundwater treatment facility design, including preliminary design calculations, equipment selection, preliminary cost estimation, air emission estimation, and process and instrumentation drawings. The treatment facility includes advanced oxidation, physical/chemical metals treatment, membrane bioreactor, and adsorption system. Commissioning Manager prepared a Start-up and Commissioning Plan for the Groundwater Treatment Facility, including identifying required temporary equipment during the start-up phase. Project Engineer prepared the O&M Plan for the Groundwater Treatment Facility. Process Engineer/Project Manager providing continued engineering and consulting support to evaluate the site-wide treatment processes at the Groundwater Treatment Facilities for potential PFAS and 1,4-dioxane removal. The treatment processes evaluated include MBR, Granular Activated Carbon, and ion exchange resins. The scope of work involves biological 1,4 dioxane removal, well-head electrochemical oxidation and plasma treatment, segregated stream Fenton's treatment bench testing, and evaluations.

Elkton, VA, Merck, Industrial Wastewater Treatment Upgrades. Process Engineer served as part of a multi-disciplinary design team. Scope of work included upgrading the existing wastewater plant and developing an Authorization for Expenditure scoping package, which included an approximately 10 percent total installed cost estimate. Process scope included upgrading Equalization Tanks, Biological Aeration system, new clarifiers, new solids drying and handling, utilities, and non-contact cooling water systems, automation, instrumentation, and new pump station for head of plant. Project's estimated cost was over \$83 million. Performed process calculations, developed Piping and Instrumentation Drawings (P&IDs) & datasheets, assisted 3D model & equipment/line/valve list development.

Millsboro, DE, Merck, High Ammonia Loading Reduction Alternatives Evaluation Lead Process Engineer The work included characterization of source wastewater, alternatives evaluation including source segregation, biological ammonia removal, evaporation, and advanced oxidation. FEL-1 was conducted for the selection option of source segregation, equalization, and pH neutralization system.

Bridgewater, NJ, American Cyanamid. 1,4-Dioxane Treatment Alternatives.

Lead Process Engineer/Project Manager performed a technology evaluation for removal of 1,4-Dioxane at the extraction well head, segregated groundwater for highly contaminated groundwater extraction wells, and combined groundwater. Technologies evaluated were biological removal with co-substrate, plasma oxidation, electrochemical oxidation, Fenton's oxidation, Ultraviolet/Peroxide oxidation, Ozone Oxidation, and RO. biological removal with co-substrate, plasma oxidation, electrochemical oxidation, and Fenton's oxidation bench-scale treatability testing were conducted for proof-of-

concept treatment. End-of-pipe (groundwater treatment effluent) treatment alternatives are currently underway

Confidential Client, Pennsville, NJ. Pharmaceutical Manufacturing Wastewater Treatment Plant Operation Optimization Analysis. Lead Process Engineer performed a WWTP Operation Optimization analysis for pharmaceutical wastewater stream. This evaluation included process alternatives, equipment upgrades, automation, as well as WWTP effluent discharge options. The evaluation included an American Association of Cost Engineers (AACE) Class 5 cost estimate, operational cost estimate, and payback period estimation.

Amgen, Thousand Oaks, CA, Groundwater Treatment Facility Evaluation. Process Engineer evaluated treatment options and performed AACE Class 5 cost estimation for a conceptual groundwater treatment facility.

Amgen, Multiple Sites, Water Reuse Facility Alternatives Evaluation and Engineer of Record Design. Lead Process Engineer evaluated treatment options to meet Amgen's water reduction. Analyses were performed at Thousand Oaks, CA, West Greenwich, RI, and Cambridge, MA sites. Some of the analyses are sitewide mass balance, water recycle model generation, technology evaluation including membrane capacitive deionization, reverse osmosis, softening, reverse osmosis, evaporation/condensation, crystallization, and dewatering. Various treatment trains were considered and Class 5 cost estimates were established. Selected option then carried on engineer of record phase of the project and Class 4 cost estimates were established.

Mine, Energy, and Manufacturing Water and Wastewater

Confidential Client, Boise, ID. Slurry Sludge Management Alternatives Evaluation. Lead Process Engineer performed alternative evaluation of a slurry management system for an acid mine water treatment process. The scope of work involves the preparation of a design basis, alternatives evaluation, technology evaluation, financial analysis, and summary technical memorandum.

Grand Rapids, MI, Covanta Energy Inc. Contact Water Treatment Study. Project Engineer evaluated the contact water pre-treatment systems for mercury removal and the stormwater rerouting system. Reviewed available fine solids control technologies, conducted alternatives evaluation, and the conceptual design of a recommended option. Developed budgetary level cost estimate.

Confidential Client, International (Canada). Selenium Treatment Technical Evaluation. Project Engineer performed a mass balance evaluation for 13 different selenium treatment alternatives. The selected conceptual design package was prepared, and this package included process major equipment list and an AACE Class 5 cost estimate.

Lake Orion, MI, General Motors, Wastewater Treatment Plant Upgrades Detail Design Led the design of wastewater treatment upgrades. Work includes alternatives analysis, process design, equipment selection, and detailed design.

Watervliet, NY, Watervliet Arsenal Hexavalent chromium [Cr (VI)] WWTP Pilot Plant Design and Commissioning Lead Process and Design Engineer for a batch Cr (VI) metals removal system design. Assisted start-up and commissioning team

Refinery and Data Center Water and Wastewater

Confidential Refinery Client, Delaware City, DE. Wastewater Treatment Plant Process Evaluation. Project Engineer performed routine process performance calculations for the overall WWTP.

Confidential Refinery Client, Confidential Location in Australia, WWTP FEL 2 Stage Gate Design

Subject Matter Expert served as a subject matter expert. Reviewed proof of concept biochemical methane potential, bench scale anaerobic digestion treatability testing plan and results, design calculations, flow and material balance, PFD, and P&IDs. The treatment process includes anaerobic digester, biological ammonia removal system, activated sludge process, ultra filtration, reverse osmosis and dewatering system.

Confidential Technology Client, Confidential Location, Data Center Water Reuse Detail Design Design Manager: led the design of a new TDS removal system (Membrane Capacitive Deionization (CapDI®)) with a capacity of 45,000 gpd. Work includes process design, design, detailed design and bid package preparation, and financial analysis.

Pulp and Paper Water and Wastewater

Baltimore, OH, Greif (formerly Caraustar), Wastewater Treatment Plant Evaluation and Whole Effluent Toxicity Review. Process Engineer assisted a recycled paperboard mill that experienced transient non-compliance issues with their whole effluent toxicity (WET) National Pollutant Discharge Elimination System permit limits. Investigated the toxicity sources, identify potential remedies for toxicity reduction, and implement a solution to obtain regulatory compliance. The scope of work included performing an evaluation of the operating performance of the industrial water treatment plant (IWTP), reviewing processes and chemicals used within the mill and IWTP, conducting detailed reviews of WET lab reports, conducting jar and bench scale testing, and performing an alternatives evaluation including AACE Class 5 cost estimates to select a preferred alternative.

Cedar Springs, GA and Monticello, MS, Georgia-Pacific, Wastewater Treatment Plant Evaluation.

Lead Process Engineer evaluated the WWTP to develop a strategy to reduce risks for non-compliance, reduce O&M costs, manage solids more efficiently, reuse solids where possible, and achieve low concentrations for the parameters of concern at GP Cedar Springs Mill and Monticello Mill. Some of the analyses performed; primary clarifier evaluation, reduction of the WWTP footprint, aeration stabilization basin (ASB) evaluation, dewatering system evaluation, hydraulic capacity evaluation and lift station pump upgrades, foam control, instrumentation and automation.

Monroeville, AL, Georgia-Pacific, Wastewater Treatment Plant Evaluation Lead Process Engineer evaluated WWTP to meet Europe ecolabel certification, specifically Nordic Swan at Alabama River Cellulose Mill. Evaluation involved at-source and end-of-pipe treatment alternatives to achieve the Nordic Swan guidelines for phosphorus, chemical oxygen demand, and energy intensity.

Syracuse, NY, WestRock, High Rate Anaerobic Designer and WWTP Upgrade Lead Process/Process Mechanical Engineer for a design-build High-Rate anaerobic digester upgrade project at WestRock-Solvay Mill. Design included new high rate anaerobic digester, flash aeration tank upgrades for calcium removal, dissolved air floatation (DAF) to Suspended Air® Flotation (SAF®), and end of pipe screening (on-going work 2024)

Municipal Wastewater Treatment

Wards Island, NY, Disinfection Alternatives Evaluation Wards Island Wastewater Treatment Plant. Project Engineer conducted a disinfection study to evaluate the performance of the different disinfectants, namely, chlorine, chloramine, and peracetic acid. The evaluation included chemical dosage, residual concentrations, contact time, and fecal/chloroform kill efficiency.

Newark, NJ, Passaic Valley Sewerage Commission. Secondary Clarifier Modeling. Project Engineer modeled secondary clarifiers by using Ansys/Fluent. Conducted bench and field experiments to

determine the model input parameters. The model was calibrated by conducting field dye testing, stress testing, and wet weather testing.

Coney Island, NY, Coney Island Wastewater Treatment Plant. Wastewater Characterization. Project Engineer conducted wastewater characterization for a biological nutrient removal upgrade project.

Wards Island, NY, Wards Island Wastewater Treatment Plant. Struvite Prevention Alternatives Analysis. Project Engineer analyzed operating data and performed a literature study (research papers and case studies). Conducted bench scale studies to evaluate struvite control alternatives; namely, the addition of Ferric Chloride and aeration of the digested sludge.

Wards Island, NY, Wards Island Wastewater Treatment Plant, SHARON Process Evaluation and Model. Project Engineer evaluated and modeled a full-scale single reactor system for high-activity ammonium removal over nitrite (SHARON®) in New York City. The evaluation consisted of sampling and analyzing the samples for COD, Ammonia, Nitrate, Nitrite, and Suspended Solids. From the years of collected data, the process was modeled and calibrated the model by using BioWin.

Wards Island, NY, Wards Island Wastewater Treatment Plant, Evaluation of Anaerobically Digested Sludge Gas Production. Project Engineer conducted bench-scale studies to evaluate digested sludge gas production, production rate, and solids destruction. Operated Anaerobic Ammonia Oxidation (ANAMMOX) Moving Bed Biofilm reactor (MBBR)

Brooklyn, NY, 26 Ward Wastewater Treatment Plant. Project Engineer operated a 2000-gallon MBBR pilot plant facility retrofit in order to evaluate the performance of ANAMMOX, a recently discovered biological nitrogen removal technology, for a project funded by New York State Energy Research and Development Authority and New York City Department of Environmental Protection.

Publications and Presentations

- A. A. Alleyne, S. Xanthos, K. Ramalingam, K. Temel, H. Li, and H. S. Tang, Numerical investigation on flow generated by INVENT mixer in full-scale wastewater stirred tank. *Engineering Applications of Computational Fluid Mechanics*, 2014, 8(2014), 503-517
- “Struvite Control: An Alternative Approach,” for the New Jersey Water Environment Association Annual Conference, 2014, at Bally’s, Atlantic City, New Jersey (presenter) (lead author)
- “Alternative to Traditional Struvite Control Practices” for the NYWEA 86th Annual Meeting 2014 at Marriott Marquis Times Square, New York, NY. (presenter)
- “Struvite Control Prior to Dewatering at Waste Water Treatment Plants: An Alternative Approach” for the WEFTEC 86th Annual Meeting 2013 at McCormick Place South, Chicago, IL. (presenter) (lead author)
- “Process Performance Evaluation of a Full-Scale Single Reactor System for High Activity Ammonium Removal Over Nitrite (SHARON®) Demonstration Facility at Wards Island WWTP in New York City” for the NYWEA 84th Annual Meeting 2012 at Marriott Marquis Times Square, New York, NY. (presenter)
- “Process Performance Evaluation of a Full-Scale Single Reactor System for High Activity Ammonium Removal Over Nitrite (Startup and Commissioning of an Advanced Leachate Treatment Plant)” for the NJWEA Annual Technology Transfer Seminar 2019, Atlantic City, NJ. (presenter)