

Mark Laquidara

Private Consultant



Education

PhD, Civil & Environmental Engineering,
Northeastern University, 1985
MS, Civil & Environmental Engineering,
University of Lowell, 1978
BS, Civil Engineering, Lowell Technology
Institute, 1976

Registrations

PE, MA, 33711, 1988
PEng Nova Scotia 84082, 2009

Training and Certifications

Certified Wastewater Treatment Plant
Operator, Massachusetts
Class VII 5288, 1992

Professional Associations

Water Environment Federation
New England Water Environment Association

Experience

Private Consultant
2011 to present

AECOM

VP National Wastewater Practice Leader
2005 to 2011

VeoliaWater North America
VP Director of Plant Support
2000 to 2005

Massachusetts Water Resources Authority
Deputy Director Process Control &
Engineering
1987 to 2000

Dynatech R/D Co
Senior Process Engineer
1985 to 1987

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Dr. Laquidara has over 35 years of experience in the public and private sectors, mostly within the wastewater and biosolids/energy recovery arena. Past expertise concentrated on plant engineering, process design and optimization, day-to-day operations, and troubleshooting. He has particular experience in solving plant compliance issues and optimizing processes through engineering investigations both through operations and capital improvements.

Experience

- AECOM - Conducted TAT process quality reviews for over 75 wastewater designs. TAT process reviews included all types of treatment including the wastewater treatment, biosolids processing and energy recovery carried out by AECOM in North America.
- AECOM - Served as wastewater treatment process technical specialist for the expansion and upgrade of wastewater treatment plants in Lee, Massachusetts, Manchester, New Hampshire, Cranston and Warrick, RI, Meriden, Bridgeport, and Southington, CT, Moorefield, WV, Western Branch, MD amongst others all involved planning and design services.
- AECOM - Served as wastewater treatment process technical lead for the recent upgrade of wastewater treatment plants in Nashville TN (wet weather treatment), Honolulu, HI, Columbia SC, Portsmouth NH, amongst others all involved planning and conceptual design services.

Operations

- AECOM - Served as technical specialist providing assistance and evaluation of specific technical issues related to ongoing operations at wastewater treatment plants in Meriden, Cheshire, and Bridgeport, Connecticut, and Cranston, Rhode Island, Nashville TN as well as others.
- VWNA - Managed a contract operations firm's central plant support department, which provided technical services for the operation of more than 275 wastewater and 75 water treatment works in North America. Oversaw the development of technical programs involving applied standard process control and plant engineering practices. Worked with plant personnel to conduct margin enhancement efforts and correct

process performance and compliance issues. Introduced new technologies and provided general trouble shooting services.

- MWRA - Served as deputy director of process control and engineering at the 350-mgd Deer Island wastewater treatment plant for the Massachusetts Water Resources Authority. Provided technical direction, budget development and oversight, system turnover and start-up, day-to-day operation, and work products review for the 25+ technical staff members. Oversaw day-to-day process control including process set-up and evaluation, permit development and daily compliance, reporting, plant engineering, process and energy optimization, control system operation and maintenance, warranty tracking and monetary recovery, and process engineering.

Large Facility Commissioning

- MWRA - Served as technical lead for Operations and Maintenance at the 350-mgd Deer Island wastewater treatment plant for the Massachusetts Water Resources Authority. Provided technical direction for all engineer and contractor testing, developed and carried-out all owner/operator independent testing, responsible for system acceptance, start-up, optimization and one year certification. This work multi-phased commissioning effort was carried-out over a six year period and involved all treatment and power generation facilities.
- Private Consultant - Serving as a commissioning specialist member within the Strategic Process Planning Committee. The SPPC is tasked to provide technical oversight and direction setting for the upcoming commissioning the on-going major improvements occurring at the Blue Plains AWT. There are five major capital improvements involving all aspects of the plant operation totaling over \$700 million.

Nutrient removal

- AECOM - Served as technical advisor for a nutrient reduction cost estimation study for the New Jersey Harbor Dischargers Group, a consortium of ten authorities in northern New Jersey that collectively discharge 750 mgd of treated wastewater to the New York-New Jersey Harbor. Provided advice and guidance in the development of technologies to achieve varying levels of nitrogen and carbon removal in conventional activated sludge plants, pure oxygen activated sludge plants, and trickling filter plants. Reviewed capital and O&M cost estimates and corresponding cost curves for each plant to achieve high, medium, and low levels of additional nitrogen and carbon removal.
- AECOM - Served as a technical advisor for ongoing biological nutrient removal and enhanced nutrient removal programs for the New York City and Long Island Sound and Chesapeake Bay initiatives, which involve the planning and upgrade of existing facilities to achieve BNR and ENR removal goals through plant optimization, retrofits, and additional unit processes. Providing advice on new technologies, improved operation, and process engineering evaluations to define long-term needs.
- AECOM - Served as wastewater process specialist for new and retrofit upgrades of various water pollution control facilities for nitrogen and/or phosphorus removal including Meriden, Cheshire, Jewett City, Bridgeport CT, Keene and Newport, NH, Westborough, MA, Cranston, RI, Moorefield WV, Back River, Patapsco, MD, Blue Plains DC amongst others.

- AECOM - Served as blue ribbon panel member for the city of Spokane, Washington's low phosphorus treatment piloting program. The City is currently investigating new technologies to achieve very low, < 0.01 mg/L TP.
- AECOM - Served as core team member for the WERF funded Nutrient Challenge Program.

Water reuse

- AECOM - Served as program lead for the development of a water reuse plan for the city of Spokane, Washington. Considering several membrane reuse treatment options including a membrane filtration for a hard plumbed system for use in close proximity to the WRF, as well as MBR satellite sewer mining options, for management of potentially 10 to 15% of total plant flow. Conducting demonstrations that are geared to obtain public acceptance for this technology.
- VWNA - Developed concept design and a pricing estimate for the addition of up flow sand filters to treat reuse water and discharged effluent at a 13-mgd wastewater treatment plant in Cranston that provides 3 mgd of reuse water to Florida Light & Power.

Membrane Experience

- AECOM - Served as lead technical reviewer for various MBRs treating domestic wastewater including Davies, FL 6 mgd MBR facility, Aramco KAPSARC Sewage Treatment Plant, Saudi Arabia 0.3 mgd MBR facility, LNR Private Development Weymouth MA 0.5 mgd MBR facility and Kukui'ula HI MBR facility.
- AECOM - Served within the technical review team for a specialty MBR Projects, Logan Township, NJ. Project coupled a MBR with Advanced Oxidation and Reverse Osmosis for indirect potable water reuse.
- VWNA - As central support director for contract operations firm, evaluated and corrected operational and warranty issues for operating Cohasset MA MBR facility.

Biosolids

- Private Consultant- Served as a technical consultant for new biosolids technology equipment/services provider. Duties include conducting detailed material and energy balancing, managing path to regulatory approval, and advising and assisting technology provider a path forward in establishing a presence in the US market.
- AECOM - Served as a technical advisor for ongoing biosolids master plan for Bridgeport, CT. Bridgeport has two BNR facilities, a 12 mgd and 32 mgd. This master plan addressed biosolids processing needs for both of these facilities
- MWRA - Represented MWRA engineering/operation team during design and start-up of all treatment works. Treatment works included biosolids processing which consisted of the processing of 200 tpd. Facilities consisted of pre and post thickening, anaerobic digestion and digester gas utilization is a co-generation facility.
- MWRA - During first 3 years of post-start-up operation, responsible for developing and carrying-out biosolids processing and energy recovery systems optimization program.
- VWNA - Provided technical services support for over 250 operating wastewater treatment plants operating in North America. Biosolids processing unit processes (thickening, stabilization, dewatering, incineration, energy/product recovery, etc.) were all common issues for

these facilities. Solutions were varied, but generally consisted of evaluation and implementation of the most cost effective solutions.

Energy Recovery

- AECOM - Served as technical specialist evaluating digester gas utilization opportunities for Philadelphia Water Department. Provided follow-on technical review for selected utilization improvement scheme; cogeneration application using internal combustion engines for electrical power.
- AECOM - Served as technical review for the Blue Plains biosolids conceptual design. This project evaluated several biosolids stabilization/energy recovery schemes for DCWASA's 370 TPD biosolids stream.
- AECOM - Served as technical lead for providing third party technical review for the Stamford, CT gasification project. This project consists of a mixed 40 TPD biomass (biosolids-wood) gasification-2 MWE electrical generation scheme geared to reduce current WWTP O&M costs.

Centrate Treatment

- AECOM - Served as lead technical review for the conceptual evaluation for the centrate schemes proposed for NYDEP's Wards Island WWTF. The final selection is now constructed and start-up of the largest Sharon process is now underway.
- AECOM - Served as technical process specialists for new and retrofit upgrades of various wastewater plants where centrate treatment, handling and/or management is required including removal including Meriden, CT, Back River, Patapsco, MD, Moorefield WV, NYDEP various plants amongst others.
- AECOM - Served as lead technical review for evaluating various centrate schemes for the Blue Plains AWTF as part of the Nitrogen Master planning effort. Approximately 1 mgd of strong centrate will be generated from dewatering Cambi-AD treated sludge; all centrate treatment options (biological and physical/chemical) are under consideration.
- AECOM - Served as technical lead for evaluating and optimizing Cranston RI operating separate centrate treatment system. This process treats combined sludge dewatering /incinerator scrubber water recycle stream for both CN and nitrogen.
- AECOM - Served as AECOM's technical coordinator for the joint NYDEP 26th Ward Street demonstration. This demonstration project, a 1 mgd vacuum distillation ammonia-sulfate product recovery demonstration is currently under designed.
- AECOM - Served as AECOM's technical leader in evaluating new technologies for separate centrate treatment. Schemes currently under evaluation showing promise include, ANAMMOX, AnAer, vacuum distillation for ammonia sulfate, ammonia hydroxide or energy recovery.

Sturvite Mitigation

- MWRA - Represented MWRA engineering/operation team during design and start-up of all treatment works. Treatment works included biosolids processing and included struvite mitigation systems.
- MWRA - Responsible for optimizing and improving struvite mitigation strategies. Corrections included further refinement of chemical addition systems, defining and implementing struvite mitigation control

strategies, and improving and implementing preventative maintenance procedures for struvite removal.

- VWNA - Provided technical services support for over 250 operating wastewater treatment plants operating in North America. Struvite mitigation was a common issue for those facilities which dewatered anaerobically digested sludge. Solutions were varied, but generally consisted of evaluation and implementation in a phased manner.
- AECOM - Conducted refresher training/system revision workshop for MWRA as part of AECOM's Deer Island As-Needed Consultant Contract. MWRA was in the process of reworking digester discharge piping and desires to incorporate additional struvite mitigation methods.

International

- AECOM - Served as external wastewater process lead for the master planning effort defining upgrade of the Auckland, NZ advanced treatment works.
- AECOM - Served as external wastewater process specialists for AECOM's Hong Kong work associated with the Harbour Area Treatment System (HATS).
- AECOM – Served as external wastewater process specialist for AECOM's Hong Kong work associated with the relocation of the Shatin WWTF.
- AECOM - Served as external wastewater process reviewer for AECOM's United Kingdom work associated with the Beckton Thames Water wastewater treatment improvement project.
- VWNA- Served as VWNA North America R/D treatment lead for coordinating NA research efforts and findings with Rest-of-World (ROW) research efforts. ROW efforts were generally carried-out at VeoliaWater's Maisons-Laffitte research facility located outside Paris, France.

High Rate Anaerobic Treatment Experience

- Master's Thesis – University of Lowell 1978 – Topic “The Treatment of Apple Processing Wastewater by the Anaerobic Filter Process”
- PhD Dissertation – Northeastern University 1985 – Topic “The Anaerobic Rotating Contactor: Process Analysis”
- AECOM – Provided technical review for a feasibility study comparing an anaerobic sludge blanket system to existing aerobic lagoon treatment for a recycle paper mill.
- VWNA - Technical lead for a new design Upflow Flow High Rate reactor for improving sludge treatment. Project goals were to demonstrate reliable performance at relatively short HRTs.
- VWNA - Technical lead for demonstrating methods for enhancing conventional anaerobic sludge digestion. Project goals were geared to demonstrate techniques for enhancing performance, or increasing organic load.
- Private Consultant - Team Leader for High Rate Anaerobic Treatment Demonstration Project. Design, constructed and evaluate performance for a 750 gpd anaerobic filter demonstration. Project goals included process confirmation, as well as obtaining management buy-in and provide plant staff training/knowledge for anaerobic treatment. These demonstrations lead to the construction of a full-scale Biothane upflow blanket reactor and aerobic polishing waste treatment system.
- Dynatech – Conducted R/D on Physical/Chemical Treatment of “Hard-to-Degrade” Feed Stocks Followed by Thermophilic High Rate

Anaerobic Treatment. Houston Power & Light Funded Research Program investigating and demonstrating the feasibility of converting lignite (soft coal) to methane gas for energy recovery

- Dynatech - Conducted R/D on Physical/Chemical Treatment of Digested Sewage Followed by Thermophilic High Rate Anaerobic Treatment. NYSERDA Funded Research Program investigating and demonstrating the feasibility of lessen sludge disposal costs and additional energy production by "twice" digesting sewerage sludge.
- Dynatech - Conducted R/D on the production of Calcium Magnesium Acetate (CMA) from Waste Materials Using Halophiles. DOT Funded Research Program investigating and demonstrating CMA production from waste products. Research centered on using halophilic organisms to produce 10% acetic acid product.