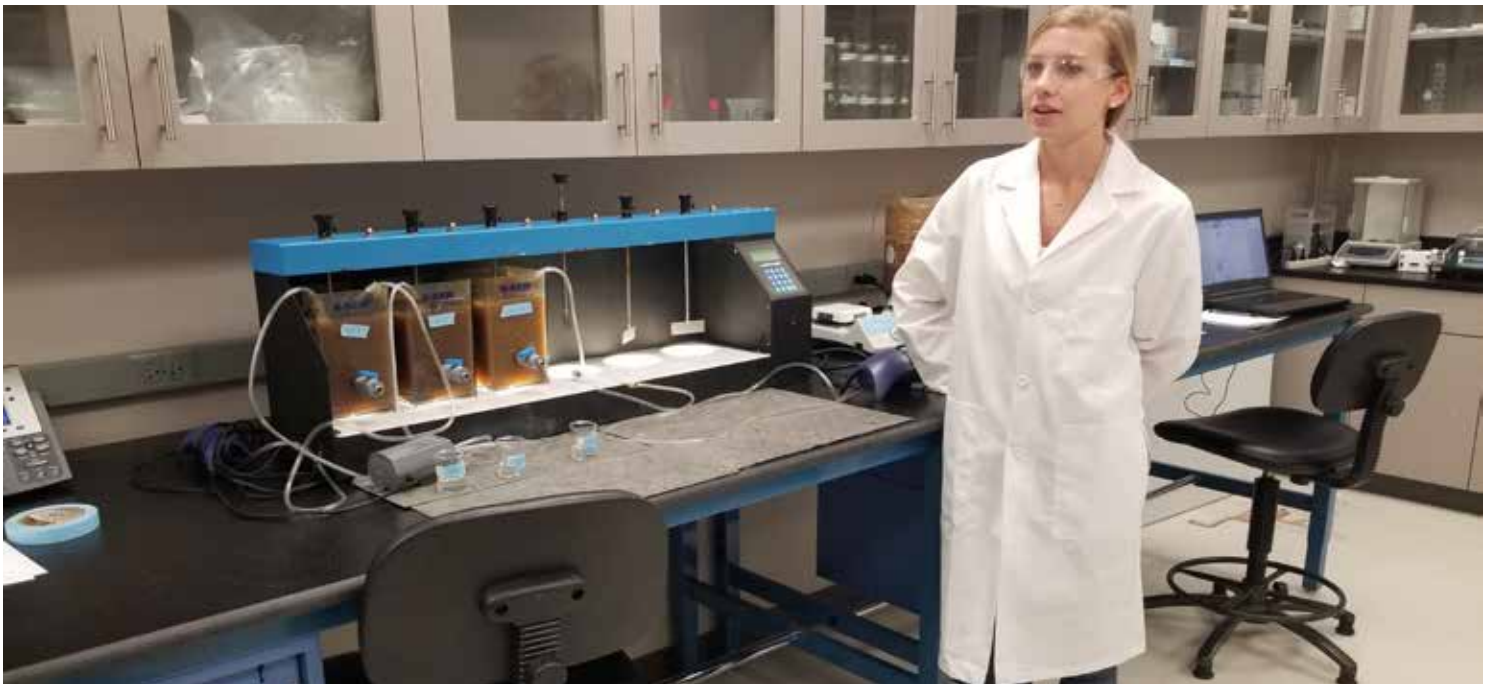

Our water group has more than 30 years of experience in the water and wastewater industry. Biological and physical/chemical treatment process design, process optimization, and bench and pilot-scale testing are among our areas of expertise.

Biological Treatment

We have conducted bench and pilot scale tests in the Dewberry treatability lab in the Raleigh, North Carolina, office and at client facilities including suspended and fixed-film activated sludge systems. Studies have been completed to evaluate the biological treatability of high-strength industrial wastestreams and unique organics. In addition, bench scale studies have evaluated carbon sources for nutrient removal from a wastestream, such as methanol, glycerin, and brewery waste. Biological bench scale studies have been conducted to understand substrate utilization rates for organics removal and nitrification/denitrification rates for nutrient removal.

Our treatability lab is equipped with a six-paddle programmable jar tester, bench scale pumps for aerating reactors, a portable pH/DO meter, a digital reactor block, and a spectrophotometer to run Hach test-n-tube kits for water quality parameters. We have experience analyzing for a variety of wastewater parameters using Hach methods, standard methods, and ion selective electrodes. Parameters we've most often analyzed include chemical oxygen demand, ammonia, nitrate, total nitrogen, total phosphorus, metals, total suspended solids (TSS), and volatile suspended solids (VSS).

Physical/Chemical Treatment

We have conducted bench scale testing of physical/chemical treatment processes. The testing includes chemical precipitation, activated carbon adsorption, and ion exchange.

Chemical precipitation testing includes the use of ferrous and ferric alum and sulfide based chemistries. Precipitation jar tests have been conducted to evaluate the removal of phosphorus and a variety of metals, including arsenic, copper, lead, molybdenum, vanadium, zinc, and gold. We conduct jar tests to optimize precipitation conditions, which results in lower chemical dose and reduced sludge generation rates.

We conduct bench scale activated carbon adsorption and ion exchange studies and have the expertise to conduct activated carbon isotherm, kinetic tests, and column tests. In addition, we perform ion exchange bench scale tests to select a resin appropriate for specific applications.

Pilot Scale Testing

We conduct pilot scale testing of biological and chemical/physical treatment technologies, both in-house and at clients' facilities. We perform pilot scale granular activated carbon columns in order to understand the carbon life of full-scale carbon contactors.

Recently, we completed a five-month pilot membrane bioreactor (MBR) operation where we were the sole operator seven days a week. We oversaw parallel pilot testing of a sequencing batch reactor (SBR) and an MBR. Pilot scale biological studies allow for the confirmation of substrate utilization rates and biomass growth kinetics before full-scale design and help identify potential operational issues.

Prior to the installation of a full-scale dissolved air flotation (DAF), a client facility wanted to evaluate the performance of a DAF for their wastestream. We operated the pilot scale DAF and analyzed the effluent for solids to evaluate performance.

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