TETRA TECH

Expression of Interest

Watoga State Park – Riverside Campground Wastewater Plant A/E Services

West Virginia Division of Natural Resources

Solicitation No.: DNR1600000021

West Virginia Division of Natural Resources

1.0 COVER LETTER

June 15, 2016

Mr. Guy Nisbet
Department of Administration, Purchasing Division
2019 Washington Street East, Charleston, West Virginia 25305-0130

Dear Mr. Nisbet:

Tetra Tech is pleased to submit our qualifications to perform design services in reply to RFQ #DNR1600000021 for the State of West Virginia to provide engineering services for the replacement of the wastewater treatment facility at the Watoga State Park. As outlined in our proposal, Tetra Tech and its personnel have completed work on *thousands of similar projects*.

Based in Pasadena, CA, Tetra Tech is a full-service engineering and science firm with a substantial global presence. We help our clients conceptualize and execute innovative solutions to their most difficult problems. From front-end science and planning to design, construction management and operations, Tetra Tech's global service network, facilitated by our initiatives program that coordinates resources for specific markets and provides best-in-class experts with worldwide project experience. They deliver a high level of integrated services for the full project life-cycle in five service areas: water, environment, infrastructure, resource management, and energy.

Tetra Tech has offices and operational infrastructure throughout the United States, Canada, and abroad. With 16,000 employees at 400 offices in more than 120 countries on six continents, Tetra Tech's technical knowledge and hands-on site work is broad and deep. Our staff is supported by a uniform administrative and management system that project teams can access immediately to ensure work is completed effectively.

Our experienced team is led by Mr. Jonathan Shimko, a licensed water and wastewater treatment plant operator and project manager with over 15 years of experience on similar projects. Jonathan has managed and supported wastewater treatment plant operation and design contracts for the West Virginia Department of Corrections. He will be joined by Mr. Thomas Gray, PE. Tom has more than 40 years of experience and has managed or supported numerous projects for the State of West Virginia. Mr. Gray is a registered Professional Engineer in the State of West Virginia. As a firm, Tetra Tech also has significant experience working for the State of West Virginia – for the WV DEP, WV DCH, WV DOC, and has worked cooperatively for our commercial clients with WV DNR.

As requested, we have uploaded an electronic copy of our EOI onto the wvOASIS website. We appreciate this opportunity to provide this proposal, and look forward to answering any questions you may have. If you should require any additional information, please contact Ms. Warino at (304) 534-4021.

Sincerely,

Stephanie Warino

Ms. Stephanie Warino, WV LRS, PG
Fairmont, WV Operations Manager

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DNR
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TABLE OF CONTENTS

ATTACHMENTS

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Fairmont, WV Operations Manager

2.0 PROJECT APPROACH

Tetra Tech's approach is to develop action plans for the replacement of the Watoga State Park wastewater treatment system (WWTS) serving the Riverside Campground, located in Marlinton, West Virginia that will:

- Comply with the requirements of the applicable rules and regulations
- Be easily constructed and economical
- Use the best available technology
- Allow the WWTS renovations to be construction with the least amount of disruption to park patrons.

2.1 TETRA TECH'S PROJECT APPROACH

It is our understanding that the WWTS at the at the Watoga State Park – Riverside Campground is in need of replacement and was designed to treat 10,500 gallons per day (GPD) via the extended aeration process. It will be of paramount importance to determine whether the flow rate of the existing plant is still applicable. As part of our effort we, with the DNR, will make that determination. We will also evaluate whether the extended aeration process is still the best process for the application.

The replacement WWTS will be designed to meet the NPDES permit requirements, which Tetra Tech understands may be re-evaluated during the design process.

The first step will be a site visit. The primary results of these visits will be a detailed scope of work and engineering cost estimate. Together these two documents will be referred to as the Action Plan. The Action Plan would include the logical phases of a project. These phases include:

- Investigation Phase,
- Planning Phase,
- Design Phase, and
- Construction Contract Administration Services Phase

Following site reconnaissance, Tetra Tech will meet internally with in-house water treatment experts and solicit additional input from DNR, where appropriate, to develop the detailed scope of work and engineering cost estimate for WWTS design and water system renovations. Tetra Tech has experience with many alternative treatment techniques which could be considered for the Watoga State Park, depending on the requirements established by the investigations, such as process type, package plant vs. custom design, level of automation, and level of staffing.

The Investigation Phase will be largely satisfied with the initial visit, although some items may not be uncovered during the on-site visit. As a result the Action Plan will include any open investigation requirements, such as survey or mapping work, if none exist, flow monitoring and water quality data generation if insufficient data exist.

The Action Plan will include the Planning Phase wherein the basis of design will be developed. The basis of design will consider the normal influent as well as the peak expected loads. It will also specify the various features that are desired for the treatment plant. The basis of design will be mutually agreed to by Tetra Tech and DNR. Once the basis of design is approved, Tetra Tech begin the Design Phase. This will include the development of design drawings and specifications (and other engineering documents, e.g., instrument lists, control lists, etc. The Design Phase can also include a project cost estimate and construction schedule.

After the design is generated and approved, and the construction contractor is selected, Tetra Tech will provide Construction Contract Administration Services. They exact services to be provided will be discussed by Tetra Tech and DNR and will be included in the Action Plan. Typically they will involve assistance during the Bid, construction inspection, drawing/design clarification, construction schedule maintenance, verification of construction payment applications, and assistance during startup. Other services can be included as well.

The Action Plan, which will form a scope of work for next phases, as well as a cost estimate for the plan implementation will be documented and submitted to DNR for approval.

After acceptance of the Action Plan, the project will begin. We have prepared a simplified example scope of work for a plan requiring wastewater treatment system. Note that the example plan follows the recommended phased approach. Tetra Tech would complete the following items of work for this type of plan:

INVESTIGATION PHASE

1. For Watoga State Park, conduct supplemental wastewater characterization studies to determine the flow and water quality parameters, if such information is not available from DNR or other sources. This information will also include information on the service population (visitors/workers) and seasonal impacts.
2. Perform supplemental survey work, if required, to provide elevations and coordinates of key locations such as tie-in points to the discharge and collection points, property boundary information, and additional construction baselines as necessary to facilitate the successful prosecution of the treatment plant. Identify alternate plant locations.
3. Identify infrastructure that will remain (and need refurbishment).
4. Utility and Regulatory Research: Contact West Virginia utility location service (WV 811) and local utilities in the contract area to locate underground and overhead facilities that may be affected by the construction. Tetra Tech will meet with involved utility companies in the Investigation and Planning Phases to determine temporary or permanent relocations and construction costs. Review the site and perform a delineation of on-site wetlands, if necessary. Contact local jurisdictional agencies regarding anticipated permit requirements. Prepare the appropriate permit applications for submittal to regulatory agencies. Applicable BMPs and storm water and other permit requirements will be fully integrated into the construction design plans and specifications.
5. Provide geotechnical and environmental site investigation services, as required. Geotechnical investigations would be provided to potentially determine foundation design parameters, such as, soil bearing pressures.

PLANNING PHASE

1. Prepare and submit a Basis of Design to the WVDNR for review and approval. For Watoga State Park, the Basis of Design will show the process flow diagrams and preliminary treatment plant arrangement proposed for the site to insure that all parties are in agreement with the design approach prior to detailed design.

DESIGN PHASE

1. Prepare detailed construction drawings including water handling, balanced grading plans, and erosion and sediment controls in AutoCAD format. Anticipated drawings include: title sheet, existing conditions plan, process drawings (process flow diagrams, piping & instrumentation drawings) general arrangements, structural, civil mechanical, piping, electrical, instrumentation drawings, grading plans (including E&S and post construction stormwater management), profiles, cross sections, and construction details.
2. Prepare process sequence of operation.
3. Prepare technical equipment and construction specifications and details for materials and installation of site improvements in conformance with the applicable current standard details and specifications available from the WVDNR.
4. For Watoga State Park, prepare supporting design calculations including structural, hydrologic and hydraulic calculations as required for water conveyances and structure design.
5. Detailed construction drawings, specifications, and design calculations will be submitted to WVDNR for review and comment.

6. Drawings incorporating WVDNR comments will be submitted as required to obtain applicable site permits, if any.
7. Prepare a bid tabulation sheet and unit estimate of probable construction cost for the proposed plant.
8. Submit a Request for Quote package with supporting final deliverables to WVDNR including:
    a. Complete set of construction drawings
    b. Construction specifications in Word format
    c. Process sequence of operation
    d. Estimate of probable cost and bid tabulation sheet
    e. Copies of survey data and field logs
    f. Permit approvals as applicable

CONSTRUCTION CONTRACT ADMINISTRATION SERVICES

1. Provide assistance during the Bid including conducting Pre-Bid Meetings for the bidders.
2. Provide construction inspection personnel. The construction inspection will be documented on a daily basis (every day that the inspector is on site).
3. Provide drawing/specification/design clarification to the contractor.
4. Maintain the project schedule and provide monthly updates.
5. Verify Contractor's payment applications.
6. Provide assistance during plant start-up.

3.0 COMMUNICATION PROCEDURE

Tetra Tech prides itself on its adherence to maintaining project budgets and completing projects on time. In order to accomplish these achievements, Tetra Tech has in place a rigorous project management system, which is uniform throughout the company.

Project Communication – Tetra Tech recognizes the need to maintain two-way communications with clients. To achieve this, Tetra Tech will prepare and issue a monthly progress report which will highlight the month's activities, accomplishments, report on the status of the project schedule and budget. The monthly status report will also forecast the activities in the upcoming month. In addition to the monthly report, Tetra Tech will schedule a weekly conference call with WVDNR to bring WVDNR up to date on current activities and resolve any questions or issues before they become stumbling blocks.

In addition to issuance of reports and conference calls, Tetra Tech proposes a status meeting to be held either on site, if facilities are available, or at the WVDNR office on a monthly basis. Ideally these meetings would be held approximately one week after the monthly report is issued. Specific subject calls and meetings can be held as needed to keep the project progressing.

Budget Oversight – At the beginning of each project, a budget is established. The budget is established by tasks, in the instance of this project, it would be based on Phase. Each of the tasks would be further subdivided into such categories as labor, procurement, travel, and the like. Tetra Tech has a centralized accounting system that tracks and reports expenditures (as well as receivables). The project manager has access to various cost reports on a weekly and monthly basis. In addition to the project manager's review of the financial status of the project, a monthly review is held on a monthly basis with office management. As part of the project manager's review, the project manager is expected to identify and budget trending to exceed the budget. The project manager will then identify the cause and remedy the situation. The financial status with respect to the budget will also be reported on a monthly basis to WVDNR in the Monthly Report as noted above.

Schedule Maintenance – At the initiation of the project, a Baseline Schedule is developed. This schedule will include the major tasks, durations, and relationships. The schedule will also include any Milestones and associated dates, such as Phase 1 Completion, Engineering Drawing Submittal, etc. The Milestones and their dates are agreed

to by both WVDNR and Tetra Tech. This becomes the Baseline schedule.

During the course of the project, the schedule is updated for actual progress and possible changes. The updates can be done on a monthly or biweekly basis. These are reviewed on the same frequency as the budget. A copy of the updated schedule will be included in the Monthly Report. Internally, the schedule is reviewed in the project review meeting with management. Note that, while the durations and progress is updated on the schedule, the agreed to milestones cannot be changed without agreement from both parties.

4.0 PERSONNEL & PRIOR EXPERIENCE

Our capacity encompasses more than 80 disciplines with sufficient engineers, scientists, and support staff to fulfill a contract in any of its five service areas: water, infrastructure, the environment, energy, and natural resources. For those disciplines outside of Tetra Tech's capacity, the firm maintains excellent relationships with an extensive network of sub-contractors. Tetra Tech's capacity is reflected in the number of personnel in the following selected disciplines.

PITTSBURGH AREA PERSONNEL	NUMBER OF EMPLOYEES
Civil Engineers/Designers	35
Mechanical Engineers/Designers	4
Electrical Engineers/Designers	4
Structural Engineers	4
Chemical Engineers	16
Geotechnical Engineers	3
Mining Engineers	4
Environmental Engineers	8
CADD/Designers	18
GIS/Database Specialists	11
Geologists/Hydrogeologists	19
Surveyors	6
Environmental Scientists/Biologists/Risk Assessors	36
Chemists	9
Archaeologists/Cultural Resource Specialists	24
Field Technicians	12
Construction Managers/Inspectors	12
Safety Professionals/Industrial Hygienists	7
TOTAL TECHNICAL STAFF	**232**

A complete Statement of Qualifications related to Tetra Tech's extensive Wastewater Services experience is provided as Attachment 1.

Attachment 1
Wastewater Services

TETRA TECH

Wastewater Services

Global Leaders in Science, Engineering, and Construction of Wastewater Solutions

tetratech.com

complex world | CLEAR SOLUTIONS™

Technical Expertise

Tetra Tech is a world leader in providing wastewater services for the industrical, commercial, municipal, and federal sectors. Tetra Tech delivers clear solutions to our clients' complex wastewater challenges. We derive these solutions from our proven understanding of science, regulatory requirements, state-of-the-art technology, and financial options. With over 14,000 employees worldwide, Tetra Tech provides superior services throughout the construction lifecycle. We customize our approach, team, resources, controls and reporting to meet the specific needs of each project. Tetra Tech has been ranked No. 1 in Water in the United States by *Engineering News-Record* for 11 years in a row, and we continue to build on the drinking water and wastewater treatment expertise we've developed over four decades. We are ranked among the top 10 firms for wastewater treatment by *Engineering News Record* for 2014.

We meet the needs of the industry to provide engineering and environmental services required in today's operation and water reuse. Our engineers have extensive experience and understand the demands put on the environment. We have had great success in providing engineering support to plant engineering groups, skilled trades, and installation contractors. Our goal is to enhance our clients' success by becoming integral members of the plant team and bringing experience to facilities design and rehabilitation.

In the last ten years, we have self-performed more than $100M in facility construction management, engineering, and environmental compliance support. Additionally, our experts completed a pilot study for treatment of the waste stream from a Coca Cola production facility using a membrane bioreactor followed by reverse osmosis to produce reclaimed water that can be reused in the production process.

Wastewater Services

Tetra Tech's wastewater engineers specialize in wastewater collection, transmission, treatment, effluent disposal and reuse, and other miscellaneous wastewater utility related services. Our extensive background has been focused throughout the country in a variety of projects. These projects have included the planning, permitting, design, construction management and operation start-up services associated with various related wastewater projects. In addition, our firm maintains a library of all applicable State and Federal Regulations regarding wastewater collection, transmission, treatment and effluent disposal, and understands their impacts on utility systems. Furthermore, we have members of the firm who are active on federal sludge stabilization and wastewater treatment committees.

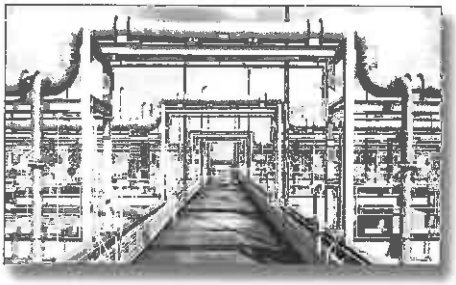
Wastewater Facility Design. Tetra Tech's approach to the design of wastewater facilities involves maximizing the use of clients' existing facilities, where feasible. Tetra Tech utilizes two important approaches to facility design. First, we evaluate the existing facilities in a comprehensive manner, but with specific detail, utilizing process and microbiology experts. For some clients, Tetra Tech often finds excess capacity available in some processes and specific limitations in others. This allows clients to increase plant capacities with limited expenditures. Second, Tetra Tech utilizes sustainability and life cycle analysis approaches to determine what is best for a specific situation, resulting in custom solutions unique to each client.

Wastewater Treatment. Tetra Tech treatment expertise includes advanced wastewater processes, effluent reuse and biosolids processing, as well as laboratory-,

pilot-, and full-scale process development and testing for difficult-to-treat wastes. Our services include all aspects of water quality and quantity management ranging from stormwater through drainage and flood control projects to major water and wastewater conveyance and treatment facilities. Our experience includes planning, permitting, design, and construction services for:

- Water treatment facilities
- Wastewater treatment facilities
- Stormwater
- Water mains
- Wastewater forcemains
- Buildings
- Distribution systems
- Sewer & conveyance systems
- Pumping/lift stations
- Storage and tanks
- Instrumentation & controls
- Mechanical, electrical & plumbing

Serving a diverse base of public and private sector clients, Tetra Tech can provide the complete range of process, civil, mechanical, electrical, and SCADA engineering disciplines, as well as environmental reviews and construction administration services. Our planning and design capabilities include water, wastewater and recycled water treatment plants, pumping stations, storage reservoirs, and pipelines.



Wastewater Collection. For collection systems, Tetra Tech provides hydraulic analysis, design, and construction engineering services that range from simple gravity sewer-line extensions to force mains with pump station complexes. These systems are designed for varying site conditions: high groundwater, shallow bedrock, very cold climates, corrosive wastewater and/or soils, and stream and highway crossings.

Energy and Process Optimization

Most wastewater and reclaimed water treatment plants can save significant money in energy and chemical costs. At Tetra Tech, we work with clients to optimize their treatment processes. Process evaluations can not only reduce energy costs, but often reduce chemical costs and improve treated water quality. Our experts can support optimizing treatment processes, saving energy, and reinvesting the savings.

Industrial Services

Tetra Tech meets the needs of the industry to provide engineering and environmental services required in today's operation and water reuse. Our engineers also have extensive industrial experience and understand the demands put on the environment.

Tetra Tech has had great success in providing engineering support to plant engineering groups, skilled trades, and installation contractors. Our goal is to enhance our clients' success by becoming integral members of the plant team and bringing experience to facilities design and rehabilitation.

The following pages provide detailed examples of our project experience and profiles of our technical experts.

Wastewater Service Capabilities

Master Planning

- Asset management
- Facility planning
- Capital improvement planning
- Regulatory compliance
- Sustainability planning

Management Consulting

- Rate studies
- Financial planning
- Security
- Threat and vulnerability assessments
- GIS-based maintenance planning

Collection and Transmission

- Sewer system evaluation surveys
- Flow monitoring
- Infiltration and inflow studies
- Sewer rehabilitation and restoration
- Large diameter forcemains
- Lift stations
- Hydraulic modeling
- Reclaimed water transmission and distribution
- Alternative collection systems

Instrumentation and Control Systems

- SCADA
- Remote status and control
- Data management and trending analysis
- Automated process control strategies

Treatment Facilities

- Flow equalization
- Sedimentation
- Biological nutrient removal
- Activated sludge
- Sequencing batch reactors
- Membrane bioreactors
- Fixed film processes
- Oxidation ditch technology
- Aerated lagoons
- Disinfection and dechlorination
- Nutrient recovery systems
- Small community and decentralized systems
- Soil dispersal and aquifer recharge
- Constructed wetlands
- Water reclamation
- Membrane treatment of secondary effluent
- Process evaluation and optimization

Biosolids and Organics Management

- Dewatering and thickening
- Composting and pelletization
- Incineration and land application
- Anaerobic and aerobic digestion
- ATAD
- Anaerobic digestion and power generation
- Animal waste management
- Co-digestion of solid wastes and biosolids

Odor Control

- Biological
- Chemical
- Air ionization

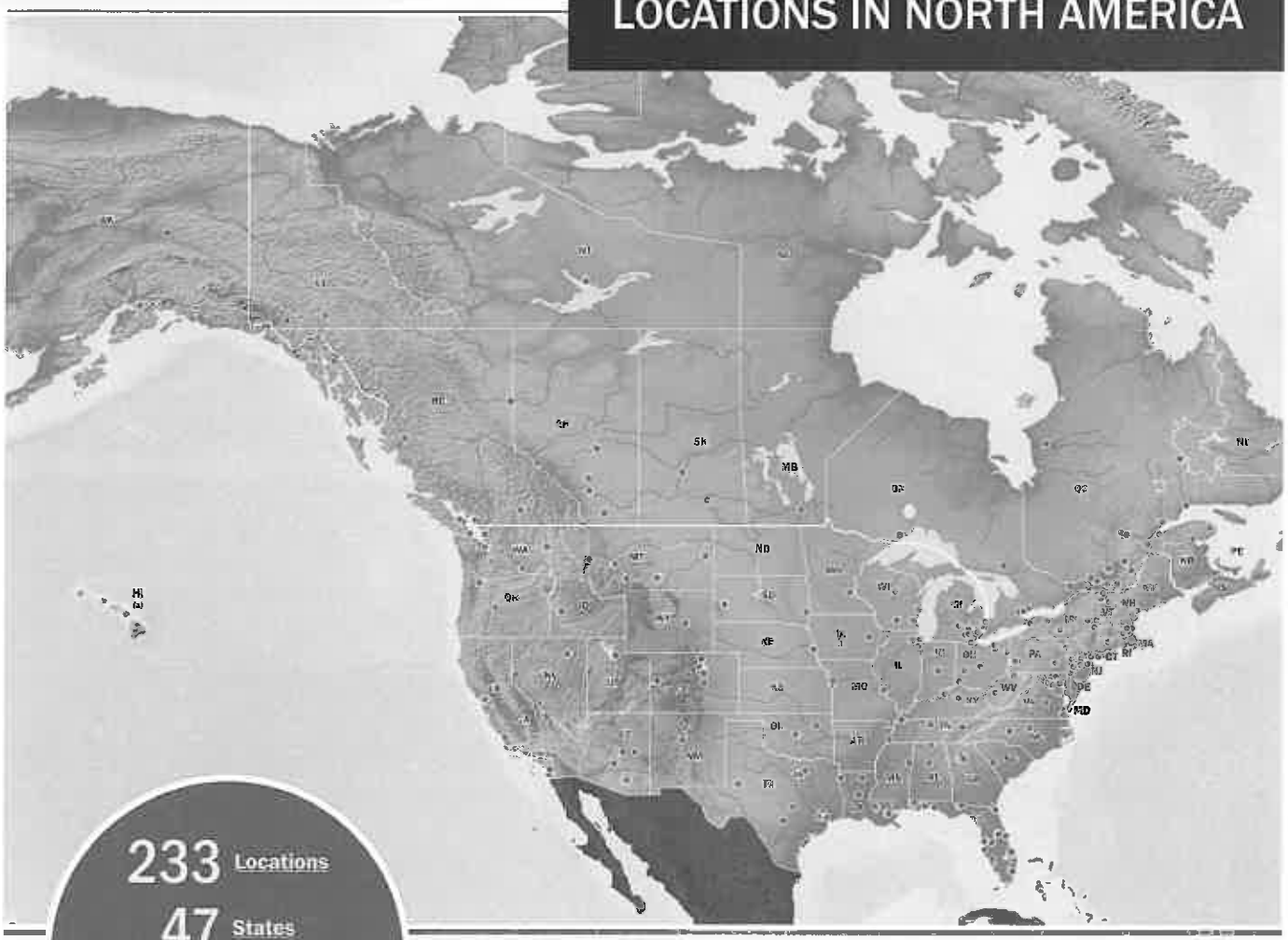
Operations and Training

- Process control
- Microbiology
- Biological nutrient removal
- Plant optimization
- Comprehensive performance evaluations
- Energy efficiency
- Energy audit and optimization
- Process troubleshooting

Construction Phase Management

- Resident engineering services
- Owner's representative services
- Design-build delivery
- CM-at-risk delivery
- Performance testing services
- Start-up and training services

LOCATIONS IN NORTH AMERICA



233 Locations
47 States
7 Provinces
2 Territories

*Representing 213 offices

Tetra Tech is a leading provider of consulting, engineering, program management, construction, and technical services addressing the resource management and infrastructure markets.

The Company supports government and commercial clients by providing innovative solutions focused on water, the environment, and energy. With 14,000 employees worldwide, Tetra Tech's capabilities span the entire project life cycle.

TETRA TECH

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PROJECT EXPERIENCE

WESTERN AREA WASTEWATER TREATMENT PLANT EXPANSION, HUNTSVILLE, AL

Tetra Tech completed design of a 5.0 MGD expansion to the existing Tetra Tech–designed 10.0 MGD activated sludge facility. Initially, an engineering report was prepared evaluating various alternatives for expanding the existing facility.

Process improvements and additions included screening/grit facility modifications, 5.0 MGD oxidation ditch featuring anoxic zone for denitrification (nutrient limits anticipated), circular secondary clarification, RAS/WAS pump station, scum pump station, aerobic sludge digestion, and sludge drying beds. The oxidation ditch is an EIMCO Carrousel denitIR system with a 17-foot water depth, using EIMCO's aerator with extended shaft mixer for deep applications.

Upstream of the aerated (aerobic) portion of the ditch is an anoxic (absence of free oxygen) basin with mixing. The purpose of the anoxic zone is to denitrify (remove nitrate nitrogen). This has the added benefit of reducing oxygen demand with resultant power savings. A new 16.7 MGD UV disinfection system with effluent flow monitoring was installed.

Other improvements consisted of modifications to the existing administration building to comply with the American Disabilities Act (ADA) requirements and a new maintenance garage.

WASTEWATER TREATMENT PLANT BIOSOLIDS HANDLING, YPSILANTI, MI

The Township and City of Ypsilanti, Michigan, sits outside the Detroit metropolitan area. In 2000, The Ypsilanti Community Utilities Authority (YCUA) needed to replace its 20-year-old multiple hearth biosolids incinerator. Tetra Tech's solution: a fluidized bed biosolids incinerator system with an activated carbon filter, the first of its kind in the nation. The result is the cleanest burning, most advanced municipal biosolids incinerator system in the United States.

Tetra Tech addressed several unique issues during the study and design phases, including expanding the service area and increasing capacity; the directive of the Board that the new facility should exemplify the community's environmental leadership; and that air quality requirements of the Michigan Department of Environmental Quality are more stringent than those of the U.S. Environmental Protection Agency (EPA).

Because of Tetra Tech's commitment to sustainability and our experience with regulatory consulting, we addressed these challenges through an innovative design using the newest technologies and processes.

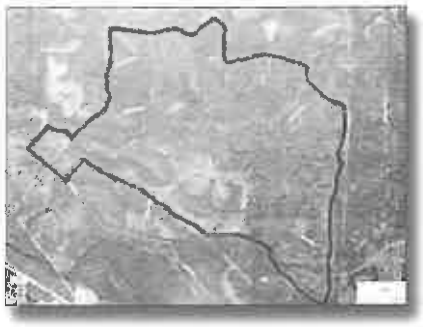
Performance testing in July 2006 revealed that system emissions were cleaner than the air permit requirements dictated. Despite handling 60% more biosolids daily than the previous incinerator, this state-of-the-art system designed by Tetra Tech resulted in a net reduction of emissions, contributing to improved air quality in the community and setting a new nationwide standard.

The YCUA Biosolids Incinerator Project won an American Council of Engineering Companies (ACEC) National Honor award in 2007.

HOWARD F. CURREN AWTP PROCESS AND ENERGY OPTIMIZATION STUDY, TAMPA, FL

The City of Tampa owns and operates the Howard F. Curren Advanced Wastewater Treatment Plant, which has a permitted design capacity of 96.0 MGD on an average annual daily flow basis. Many of the treatment technologies employed at the plant are modern; however, the City recognized that recent advances in biological nutrient removal processes might offer potential savings in operating costs and other process enhancements and supplementary technologies could offer economic benefits. Like nearly all public entities, the City is facing significant financial constraints; therefore, potential optimization programs must carefully control capital expenditures and the savings in operation costs must result in short payback periods. In 2009, the City retained Tetra Tech to develop four distinct alternative operating schemes that could lead to lower power costs and / or significant decreases in chemical costs.

WASTEWATER REUSE TO WETLANDS SURVEY SERVICES, PANAMA CITY BEACH, FL



Tetra Tech was retained by the City of Panama City Beach to prepare preliminary information for the City's proposed wastewater effluent reuse to wetlands project. Tetra Tech's services consisted of preparing a topographic survey of the 3,000-acre site.

Tetra Tech established new black and white vertical aerial photography; a color spot shot for the entire site was obtained. Horizontal and vertical ground control points were paneled, and the information was certified to Florida's technical standards requirements.

Computed horizontal and vertical control point coordinates and elevation values were used as the control for the photogrammetric instruments to collect the breaklines and mass points used in the creation of all digital topographic maps. Visible planimetric features were plotted to include buildings, pavement edges, dirt roads, visible indications of utilities, wetland vegetation outlines, ditches, fences, culverts, bridges, and group trees. Tetra Tech plotted color check plots to verify layers and database performance. Contours were generated at 2-foot intervals; spot elevations were published on tops, saddles, flat areas, and depressions to accurately depict changes in relief.

A quality control review was performed by Tetra Tech's Florida Registered Surveyor and Mapper. Color digital raster imagery was produced from the new spot shot photography and rectified to analytical triangulation and mapping.

POINCIANA WRF NO. 2, KISSIMMEE, FL

The Tohopekaliga Water Authority (TWA) purchased the Poinciana Water and Wastewater Utility Systems in 2007. Treated effluent from the various water reclamation facilities (WRFs) in the Poinciana System is transmitted to several "public access" areas such as residential subdivisions, parks, schools, and golf courses. TWA operates the Poinciana WRF No. 2, which is the largest treatment facility within the Poinciana System. Due to poor historic plant performance and long-term planning, TWA retained Tetra Tech to provide design, permitting, and construction phase assistance for an upgrade and expansion of the Poinciana WRF No. 2.

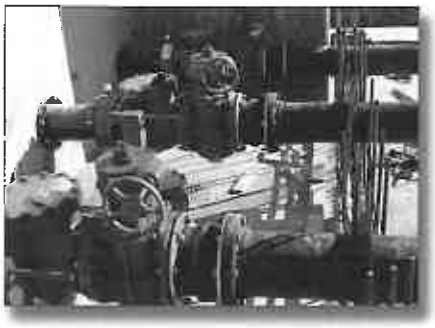
Tetra Tech provided a full range of engineering services including survey, permitting, preliminary design, final design, permitting and construction administration. Poinciana WRF No. 2 had an existing permitted capacity of 3.0 MGD on an annual average daily flow basis and utilized a sequencing batch reactor process to provide secondary treatment and a moderate degree of nitrogen control. This project involved increasing the WRF No. 2 permitted capacity to 6.0 MGD with provisions for future expansion to a capacity of 12.0 MGD. As part of the expansion, the existing SBR process was abandoned in favor of the Modified Ludzack Ettinger process. As a result of this project, the expanded and modified facility provides reliable treatment by combining biological nutrient removal technology with conventional settling, filtration, and disinfection processes. Improvements included modification of existing structure to incorporate two 3.0 mm mechanically cleaned screens and the addition of a Headcell grit removal system. A state of the art process monitoring and control system was also included which provides continuous measurement of numerous process variables at several locations and utilizes the measurements in conjunction with a sophisticated process algorithm to automatically adjust air delivery, return activated sludge flow, and internal recycle pumping.

6.0 MGD ADVANCED WASTEWATER TREATMENT PLANT RERATING AND EXPANSION NEW SMYRNA BEACH, FL

The Utilities Commission, City of New Smyrna Beach retained Tetra Tech, Inc. to provide design, bidding, permitting and construction services for a new advanced wastewater treatment plant with a design capacity of 6.0 MGD. The facility was constructed in 1999 and it employs the 5-stage Bardenpho biological nutrient removal process to consistently provide high levels of CBOD5, TSS, and nutrient removal. With development pressure and the potential construction of a new power generation facility near the plant, Tetra Tech was retained to examine flows, influent characteristics and plant performance to determine if the plant could be "rerated" to provide additional permitted capacity, or if improvements could be implemented to achieve an increased capacity.

Tetra Tech performed a detailed evaluation of flows, influent characteristics, and all unit operations and processes. Various computer simulations were used to predict plant performance under a variety of scenarios and evaluate several potential alternatives. The results of the analysis indicated that the treatment capacity of the plant could be increased from 6.0 MGD to 7.0 MGD by adding an external carbon source (methanol or MicroC). Also, the effluent transfer pumps required modification to support the increase in treatment capacity. Subsequently, Tetra Tech was retained to provide detailed design, permitting, bidding, and construction services for the recommended improvements.

WASTEWATER SYSTEM EVALUATION AND IMPROVEMENT PROGRAM, HUNTSVILLE, AL



Tetra Tech was awarded a Program Management contract from the City of Huntsville to serve as the sewer Program Manager and assist the City as its representative. This program provides improvements to pump stations within the City to address operability, maintenance and regulatory compliance. Our services include:

General Program Administration. General on-going management, engineering, planning and consulting services; developing and maintaining a management plan, including communication protocols, master schedule, and capital budget plan for the program; managing the City's use of SRF program for approximately ½ of program funding; developing, maintaining, and implementing sewer design and construction standards for consultants, developers, and contractors; developing and submitting monthly progress reports; performing agency coordination and public involvement assistance, including attending workshops, city councils meetings, etc.

Program Management. Performing ongoing cost estimating, engineering reviews, value engineering, evaluation, bidding, contract award, and scheduling for the program; coordinating with City to evaluate alternative equipment, processes, layouts and configurations, and complete evaluations; managing other consultants and professionals developing design documents for City; reviewing work of other consultants and makes recommendations to City; reviewing development plans submitted to City to provide for future planning, ensuring continuity of long range sewer development plans and conformance to standards, as well as, providing a schedule for availability of services.

JAMES B. MESSERLY WATER POLLUTION CONTROL PLANT, EXPANSION & UPGRADE, CITY OF AUGUSTA UTILITIES DEPARTMENT, AUGUSTA, GA

The City of Augusta is constructing capital improvements to the James B. Messerly Water Pollution Control Plant. The City's objective is to maximize the use of the existing wastewater treatment plant. The Messerly Plant receives domestic wastewater from the surrounding community and several major industrial contributors that had decreased the overall effective treatment reliability. With the past upgrades and the projected new improvements, the plant will be restored to its full treatable capacity.

Tetra Tech is the lead design firm for this $65 million Water Pollution Control Plant expansion project. The expansion involves converting a plant not designed for nitrification to a 46.1 MGD biological nutrient removal plant. The plant uses sodium hypochlorite disinfection as part of the treatment process. Tetra Tech designed improvements for the plant that include the following:

- Construction of new aeration basins, blower/ electrical building and equipment, flow splitting structures, hypochlorite generation system, hypochlorite storage and feed system, grit removal and dewatering system, odor control system, and three 13.8 kV 2250 kW standby generators.
- Modifications to existing aeration basins, clarifiers, splitter boxes, pumping station, and electrical systems.

Prior to this project, the facility consisted of two separate treatment trains. This separation limited the plant's capacity and flexibility, particularly when major unit processes required maintenance. Tetra Tech's innovative design integrated the former parallel trains and allowed for more flexible operation.

LIFT STATION EVALUATION AND IMPROVEMENT PROGRAM, ORLANDO, FL

Tetra Tech has provided continuing miscellaneous professional engineering services to the City of Orlando since 2000 for lift station improvements. Projects have included numerous lift station refurbishments, utility infrastructure improvements and other miscellaneous engineering services. The City's wastewater system includes approximately 200 pump stations, and Tetra Tech has provided the following services for the upgrades to numerous lift stations: preliminary engineering; hydraulic modeling; odor control; final design; permitting and construction administration.

Specific lift station improvement projects include:

Lift Station No. 69 Upgrades. Replacement of a 3,000 gpm dry pit pump with an equally sized dry pit submersible pump, replacement of electrical systems including the addition of three variable frequency drives, replacement of existing standby generator and miscellaneous influent chamber improvements.

Lift Stations No. 29, 65 and 78 Upgrades. These improvements completed on an accelerated schedule to meet SRF funding deadlines, and were completed three months ahead of schedule.

Lift Stations No. 16, 17, 52 and 57 Upgrades. These improvements also need to be completed on an accelerated schedule to meet SRF funding deadlines.

Azalea Park Sanitary Sewer System, Lift Station No. 12 and 69 and Subareas. Tetra Tech was retained to prepare a sewer system study to ascertain the levels of I/I within the areas served by LS No. 12 and LS No. 69, as well as assess the condition of the various collection system components, prioritize and classify system components with respect to criticality and condition, evaluate conveyance capacities of major transmission facilities with respect to current and projected flows and compare costs.

WASTEWATER R&R PROGRAM - PUMP STATIONS, ORANGE COUNTY, FL

Orange County Utilities' existing wastewater system contains a total of 704 pump stations, approximately 563 miles of force mains and an extensive gravity wastewater collection system consisting of approximately 1,207 miles of gravity mains. Many of these facilities have been in service for over 20 years and substantial improvements are necessary for several stations to correct existing deficiencies, ensure reliable service and meet regulatory requirements. OCU developed an aggressive wastewater R/R program to prioritize and rank pump stations and perform preliminary engineering to clearly define scopes and resolve issue that have historically delayed projects in final design. Under OCU's rehabilitation and replacement program, Tetra Tech has assessed, evaluated and performed preliminary design of 20 duplex pump stations to date, design capacity's ranged from 100 gpm to 610 gpm. Services have included:

General Program Administration. Performed general ongoing management, engineering, planning and consulting services, developed and maintained a management plan, which includes communication protocols, master schedule, and capital budget plan for the program, developed and submitted monthly progress reports, performed agency coordination and public involvement assistance including attendance at workshops, city councils meetings, etc.

Program Management. Capacity evaluation included verification of existing and future wastewater flows using pump runtimes, flow meter, drawdowns, in addition to land use, lot count and wastewater generation factors. Alternative analyses included evaluation of pump station elimination via re-routing of gravity flows to adjacent pump station tributary areas and evaluation of the adjacent pump stations to accommodate the additional flow. Each alternative site or site expansion included recommended improvements, required real estate acquisition and estimate costs for each alternative.

BIRMINGHAM WWTP, PHASE I AND II EFFLUENT DISINFECTION, DESIGN, AND CONSTRUCTION MANAGEMENT, CITY OF KANSAS CITY, MO

Through a qualifications-based selection process, Tetra Tech was selected to perform Phase I and Phase II engineering services for a wastewater disinfection facility located at the Birmingham Wastewater Treatment Plant in Kansas City.

The Birmingham WWTP is a 20 MGD average daily flow complete mixed activated sludge biological treatment that includes two parallel treatment trains with aerated grit removal, primary clarifier basins, aeration basins, secondary clarifier basins, chlorine contact chambers, effluent pump station, and solids pumping stations. The project developed micropile foundation systems to support new circular basin inside the existing square structure. Stipulated dewatering requirements for taking buried structures out of commission given the proximity of the Missouri River and threat of rising groundwater.

Phase I Services. Tetra Tech was selected to provide preliminary design and engineering reports for effluent disinfection. The project converted a portion of an administrative building to sodium hypochlorite storage and feed. Also included are pumping station rehabilitation, clarifier modification, and instrumentation control (SCADA). Tetra Tech oversees project scheduling, project costs, regulatory coordination, and subconsultant management.

Phase II Services. Ongoing during the construction phase, Tetra Tech will oversee final design, technical specifications, construction plans, and the bidding process. Tetra Tech will provide engineering and plant operational support through the construction phase of the project with post construction operations. Tetra Tech's construction management services have included onsite construction observation, progress and staff reporting, providing opinion of probable cost, O&M manual development, operator training, and plant start-up services. Tetra Tech will monitor groundwater elevations to prevent damage to empty structures. Design deliverables were submitted ahead of schedule providing the construction Contractor as additional month to meet aggressive consent decree completion dates.

COMPREHENSIVE WASTEWATER TREATMENT PLANT PERFORMANCE EVALUATION; COORS BREWING COMPANY, GOLDEN, CO

The Coors Brewing Company Process Waste Treatment Plant treats water from the Company's brewery located in Golden, Colorado. Tetra Tech performed an evaluation of the facilities and operations to determine the capabilities of the industrial treatment system and how to reduce the occurrence of poor sludge settleability and high polymer costs. Tetra Tech performed a Comprehensive Performance Evaluation on the 6.0-MGD pure oxygen activated sludge system that handles wastewater CBOD5 concentrations that are three to four times those of normal domestic waste. Performance-limiting factors were identified and prioritized followed by recommendations for solutions to eliminate those factors. Recommendations included additional testing, improved process control program, less polymer use, and internal piping changes to reroute wastewater.

Additionally, Tetra Tech assisted in developing improved process control and data collection techniques. As the lead engineer for an extensive O&M manual, required by the state, to document good process control strategies, troubleshooting charts, and data analysis, Tetra Tech analyzed the treatment processes and evaluated how they should be operated. Specifically, Tetra Tech was tasked with developing operational strategies to deal with "slug" discharges and overloaded operating conditions.

PUBLIX FOOD PROCESSING WASTEWATER TREATMENT FEASIBILITY STUDY; CITY OF LAKELAND, FL

The City of Lakeland owns and operates the Glendale Wastewater Treatment Plant and a Publix food processing center is a major industrial contributor of wastewater flow and CBOD5 to the city facility. This industrial contribution amounted to less than 10 percent of the total plant flow; however, the discharge comprised about 40 percent of the CBOD5 mass loading. This situation resulted in various capacity and operation issues, therefore, the city retained Tetra Tech to examine options for reducing the CBOD5 contribution to the Glendale Wastewater Treatment Plant.

Under this assignment, Tetra Tech developed alternatives involving sequencing batch reactors, packed towers, and conventional trickling filters to address varying levels of treatment. Subsequently, capital and operating costs were developed for each treatment alternative at 25 and 50 percent CBOD5 removal rates. This effort allowed the city to examine the economic impacts of the pretreatment concepts and make decisions regarding capital improvements, expenditures and cost recovery.

SNOQUALMIE WINERY WASTEWATER TREATMENT EVALUATION STE MICHELLE WINE ESTATES; WOODINVILLE, WA

In 2007, the management of the Snoqualmie Winery decided to increase wine production from 310,000 cases/ year to over 600,000 cases/ year. The wastewater flow for the winery averaged approximately 100,000 GPD and the CBOD5 and TSS concentrations of the untreated wastewater were in the range of 5,800 and 1,300 mg/L, respectively. Aerated lagoons provided treatment of the winery wastewater prior to discharge to the City of Woodinville sewer system; however, the strength of the wastewater resulted in anaerobic conditions and odors, particularly in the late summer.

Recognizing the need for increased treatment capacity and improved performance, the winery retained Tetra Tech to develop and evaluate options that would cost effectively facilitate the desired expansion. Under this assignment, Tetra Tech performed a field inspection and a detailed evaluation of flows and influent characteristics that were used to project future conditions, which would be used for development of alternatives. Subsequently, three alternative treatment concepts were fully developed and evaluated with respect to capital cost, operating costs, and non-monetary factors. The results of the analysis showed that sequencing batch reactors were the most advisable option due to the low cost, performance, and reliability.

CLEAN TECH, INC. WASTEWATER TREATMENT PLANT, DUNDEE, MI

Tetra Tech was retained by Clean Tech, Inc. to operate a wastewater pretreatment facility at its plastic bottle recycling facility in the Village of Dundee with a design flow of 90,000 GPD. The system discharge needed to meet the industrial pretreatment requirements for the village.

Operations consists of pretreatment of a high-strength waste resulting from a process that ground and washed plastic bottles and produced a recycled product to sell back to the bottle manufacturers. The wastewater from the process was high in BOD and suspended solids.

The operations team operates a sequencing batch reactor treatment process.

Tetra Tech continues to operate the new sequencing batch reactor process and is able to demonstrate a consistent discharge level that meets Village requirements at a reduced cost to the owner. The treatment facility is normally staffed 12 hours per day, seven days per week.

TROPICANA WASTEWATER TREATMENT FACILITY EVALUATION; BRADENTON, FL

The Tropicana wastewater treatment facility in Bradenton, Florida treats high-strength wastewater from a citrus processing operation. Tetra Tech was retained to evaluate the treatment process to determine the cause of excessive foam generation, poor sludge settleability, and related poor effluent quality. A detailed process evaluation revealed several performance-limiting factors, such as an improper return activated sludge location which caused overloading of the biomass at the aeration tank influent and poor sludge settleability.

Further, manual addition of nitrogen and phosphorus nutrients at the incorrect point in the treatment process caused formation of a polysaccharide slime, which caused the foam and much of the poor settleability. Subsequently, a minor piping change and conversion of the nutrient addition process to a drip-system from an existing tank allowed the process to be controlled as intended. These minor improvements resulted in significantly improved operation and effluent quality with only a minimal capital expenditure.

DEAN FOODS DESIGN/BUILD WASTEWATER TREATMENT PLANT IMPROVEMENTS; WAYLAND, MI

Dean Foods, also known as Bay Valley Foods since 2005, is a producer of dairy and non-dairy creamers and margarines. Tetra Tech was retained to perform design-build services for the 100,000-gallon-per-day wastewater treatment plant's two-phase expansion.

In Phase I, the facility received updates to the clarifier building, installation of a new sequencing batch reactor and a solids dewatering facility. The new system successfully demonstrated its capability of meeting the city's pretreatment requirements; however, the facility was experiencing occasional upsets attributed to an oil-based product being discharged from the production facility.

In Phase II, Tetra Tech designed a packaged dissolved air flotation (DAF) system and oil water coalescer to improve the system's capability to handle upsets. The installation met the $CBOD_5$, COD, nitrogen, phosphorous, and oil and grease limits set by the City.

Major facilities provided included rotary screen, aeration tank expansion, sequencing batch reactor, filter press, DAF, and oil water coalescer.

This design-build project had a single-source delivery method to meet the client's aggressive delivery schedule. At project completion, the plant successfully met target final effluent limitations.

PROCESS EVALUATION AND DESIGN ENGINEERING SERVICES, BROOMFIELD WASTEWATER TREATMENT PLANT, BROOMFIELD, CO

Since 2011, Tetra Tech has provided process evaluation and design engineering services to minimize off-site odor complaints, enhance biological nutrient removal performance, augment centrifuge dewatering capacity, and upgrade the control system of the Broomfield, Colorado Wastewater Reclamation Facility. This 12 MGD facility utilizes a three-stage BNR process, incorporates mixed liquor recycle pumping, and integrates fixed film activated sludge treatment in the oxic reactors.

Tetra Tech recently completed an evaluation of soluble carbon, dissolved oxygen, and centrate management options to enhance total inorganic nitrogen removal at the Broomfield Wastewater Reclamation Facility. The study concluded that denitrification performance could be improved by increase carbon availability to the anoxic zone and limiting DO recycle in the mixed liquor recycle. This study included a pilot test that involved temporarily converting an existing primary clarifier to a gravity thickener and piping the overflow to the anoxic zone of the three-stage activated sludge BNR train. Results showed denitrification performance improved by more than 20 percent.

Tetra Tech's odor control work included on-site odor source testing of the durable media biofilter, which provides 99 percent H2S and 95 percent total odor removal of the foul air being treated. The prioritized list of odor control improvements includes air ionization for the Screenings Building and replacement of the covers over the primary clarifiers and sludge holding tanks.

Along with the odor control and BNR enhancement improvements, Tetra Tech is providing process and design engineering support for replacement of the existing centrifuges, which dewater anaerobically digested biosolids prior to contract hauling and composting. This work includes upgrading centrifuge controls, so they will interface with the plant SCADA system, installation of new polymer feed systems, and relocation of the operator work station. Next year, Tetra Tech is slated to prepare a control system review and upgrade for the entire facility.

PLUM CREEK WASTEWATER TREATMENT PLANT EXPANSION AND UPGRADES, CASTLE ROCK, CO

Tetra Tech was retained by the Plum Creek Wastewater Authority (PCWA) to be their design engineer for the expansion and upgrades of its wastewater treatment plant. The project was constructed to accommodate rapid growth in the region and to comply with stringent new effluent requirements and reuse limits for ammonia and phosphorous. PCWA retained Tetra Tech to upgrade and expand their wastewater treatment plant. As with any growing community, excess capacity must be managed. As part of the project, a third oxidation ditch was constructed which only needs to be equipped with mixers and diffusers to increase the capacity of the plant to 9.7 MGD.

The major objectives for this expansion included designing a state-of-the-art and operator-friendly facility in limited space; using energy-efficient equipment with lower power, labor, chemical, and maintenance requirements; and meeting or exceeding strict water quality standards. Phase 1 included the following:

- New headworks equipment with mechanical step screens, vortex grit removal, grit pumping, and grit dewatering
- Air ionization odor control
- New plant-wide SCADA system
- New BNR oxidation ditch for nitrogen and phosphorus removal
- Secondary clarifiers
- New building with Turblex style blower, return sludge pumping, and waste sludge pumping
- Conversion of existing aeration basins to aerobic digesters
- New bi-level centrifuge dewatering building
- Centrate and filtrate storage and treatment
- New tertiary rotating cloth filters

2013 FACILITY PLAN UPDATE, METRO WASTEWATER RECLAMATION DISTRICT, CO

Tetra Tech is part of the HDR team responsible for preparing the 2013 Facility Plan for the Metro Wastewater Reclamation District (District). The 2013 Facility Plan updates flow and load projections, develops a site-specific regulatory outlook, evaluates existing plant capacities, updates the plant wide hydraulic and process models, analyzes future improvement projects, and develops a capital expenditures program for the District's Robert W. Hite Treatment Facility (220 MGD) and the Northern Treatment Plant (25 MGD) for the 25-year planning period.

Tetra Tech led the development of a facility specific regulatory outlook which will require construction of new facilities to meet the increasingly stringent regulatory environment. The regulatory outlook included both liquid and solids treatment process. The liquid treatment regulatory outlook includes future TN limits of 2.0 mg-N/L and total phosphorus limits of 0.1 mg-P/L (to comply with the Barr-Milton TMDL). The facility plan focused on evaluating treatment alternatives to meet these stringent limits using various BNR processes, post nitrification and denitrification reactors, sidestream treatment, and phosphorus recovery. The solids stream regulatory outlook included analyzing new land application regulations for phosphorus and nitrogen indexing.

The Facility Plan focuses on evaluating facilities on a comprehensive basis to account for interactions between liquid and solids treatment processes. Tetra Tech helped identify two complete treatment processes that were capable of meeting the future discharge limits developed as part of the regulatory outlook. One treatment process included a five-stage BNR process with supplemental carbon addition for denitrification; tertiary flocculation sedimentation and filtration for phosphorus removal; deammonification for centrate treatment; and phosphorus recovery for future biosolids phosphorus regulations. The second process involved a three-stage BNR process followed by a moving bed biofilm reactor for secondary nitrification and denitrification and the same phosphorus and sidestream processes as noted in the other option. The capital expenditures identified include over $1.8 billion dollars of improvements over the 25-year planning period.

WASTEWATER RECLAMATION FACILITY, CITY OF FRUITA, CO

The City of Fruita contracted with Tetra Tech to provide design and construction administration services for a new 2.33 MGD (Max Month) Wastewater Reclamation Facility (WWRF) and offsite sanitary sewer infrastructure to convey raw wastewater to the new facility. The WWRF will provide preliminary and advanced secondary treatment including biological nitrogen and phosphorus removal. The plant will be constructed on an undeveloped site near the Colorado River, west of downtown. The liquid process is designed with a single headworks facility, a two compartment anaerobic selector, two oxidation ditches with aerobic and anoxic zones, two 55-foot diameter clarifiers and ultraviolet (UV) disinfection. The solids treatment process incorporates rotary drum thickeners, a second generation ATAD process in a four-tank arrangement followed by a centrifuge for dewatering prior to beneficial use of the biosolids. Elements of the project include but are limited to the following:

- Energy efficient masonry operations building with concrete foundation, standing seam metal roofing, hollow metal doors, windows, monorail and hoist. The structure houses the WWRF plant control center, equipment maintenance and spare parts storage area, process control laboratory, restrooms and locker rooms, conference training and cafeteria facilities for staff. Building systems include domestic plumbing, lighting and high efficiency HVAC system incorporating geothermal heat recovery. This is a single story building consisting of approximately 2300 SF.
- Backup power generators and transfer switches, new electrical service, telephone service, motor control center, local PLC-based control system with four separate Human-Machine Interface (HMI) stations located throughout the plant site

WASTEWATER TREATMENT PLANT, CLIFTON SANITATION DISTRICT, CO

Due to regional growth and stringent effluent requirements, Clifton Sanitation District (CSD) retained Tetra Tech to upgrade their facility from a lagoon to a mechanical treatment system. Tetra Tech provided planning, design and construction administration services for the new plant, which was completed at the end of 2008. The new regional wastewater treatment plant has an initial capacity of 2.50 MGD, expandable to 5.0 MGD. This facility serves the Town of Clifton and outlying communities.

The preliminary design effort included consultation with the US Fish and Wildlife Service and Colorado Department of Public Health and Environment (CDPHE) to confirm effluent limits, select treatment processes, and begin the CDPHE site approval process. The new regional Wastewater Treatment Plant (WWTP) includes influent pumping, headworks, oxidation ditches, 55-foot secondary clarifiers, ultraviolet disinfection, aerobic digestion, centrifuge dewatering, odor control and a SCADA system. The major objectives for this upgrade included designing a state-of-the-art and operator-friendly facility using energy-efficient equipment with lower power, labor, chemical, and maintenance requirements; and meeting or exceeding strict water quality standards with average ammonia concentrations less than 1.0 mg/L.

As part of the construction of CSD's new regional WWTP, Tetra Tech included air ionization for odor control in the headworks and solids handling building. Ionized air is distributed into the headspace under the channel covers in the headworks to oxidize odorous hydrogen sulfide gas. The treated air is separately vented to minimize the entry of foul air into the occupied space in the headworks area. For the solids handling building, ionized air is vented into the centrifuge and truck loading bay to oxidize any hydrogen sulfide in the air. The headworks and solids handling air ionization systems have a capacity of 2,000 and 8,000 SCFM respectively.

REGIONAL WASTEWATER TREATMENT PLANT, CITY OF GLENWOOD SPRINGS, CO

Tetra Tech performed wastewater process design and implementation as a subconsultant to Schmueser Gordon Meyer (SGM) for preliminary and final design of a new 2.3 MGD Regional Wastewater Treatment Facility (WWTF). The project includes a central lift station for the City of Glenwood Springs and 3-mile force main from the existing Glenwood Springs WWTP to the new Regional WWTF site.

Overall, the new regional WWTF and support facilities will include a central lift station with air ionization odor control, parallel forcemains, headworks building with air ionization odor control, oxidation ditches, secondary clarifiers, ultraviolet disinfection, aerobic digesters, centrifuge building with biofilter odor control and a combination administration/maintenance building connected to the main process building.

Tetra Tech prepared detailed process and cost evaluation memoranda that recommended a biological nitrogen and phosphorus removal process using oxidation ditches with vertical drum mixers and a two-zone fine bubble aeration system. The recommendations included using low maintenance, energy efficient, high-speed centrifugal blowers to provide aeration for the oxidation ditches and aerobic digester. An anaerobic selector basin with mechanical mixing will be located upstream of each oxidation ditch to allow biological phosphorus removal and to help mitigate growth of filamentous microorganisms. Tetra Tech's design will incorporate other energy saving and energy recovery options such as: energy efficient lighting, roof-mounted photovoltaic cells, and thermal exchange and ventilation systems for heat recovery.

Tetra Tech incorporated three separate odor control treatment systems for the headworks, aerobic digesters, and the solids handling building. The headworks odor control system employed the use of aluminum channel covers with ionized air injected into the headspace under the covers to oxidize the hydrogen sulfide and other reduced sulfur compounds in the air. The aerobic digester and solids handling buildings incorporate the air ionization equipment into the HVAC design for each building.

WASTEWATER TREATMENT PLANT, TOWN OF LAUREL, MT

Tetra Tech is assisting Great West Engineering with upgrade and expansion of the Laurel, Montana WWTP. This includes preparation of a WWTP evaluation, preliminary design report, and drawings and specifications for (1) expansion to 1.69 MGD and (2) conversion from rotating biological contactors to a three-stage activated sludge biological nutrient removal (BNR) system. Other project components include addition of new secondary sludge pumping facilities in an existing structure, addition of a rotary drum thickener for concentrating waste activated sludge, new high speed turbine blowers, replacement of gaseous chlorination and dechlorination with low pressure UV, and chemical feed for ferric chloride, polymer, and hypochlorite (filament control). The renovated facility will meet non-degradation limits for nitrogen and phosphorous and position the City to meet tight future limits for ammonia and nutrients. Project features include:

- Expand Plant Capacity
- Decommission RBCs
- Three-Stage Activated Sludge BNR
- Reuse RBC Tanks for Anaerobic/Anoxic Zones
- New Oxic Basins & Sec. Sludge Pumping
- Renovate Existing Sec. Clarifiers
- Meet Non-Degradation for BOD, TSS, TP, & TN
- Pre-position for Nutrient Rule and TMDLs
- UV Disinfection
- RDT Thickening of WAS
- Hypochlorite Feed for Filament Control
- Ferric Chloride and Polymer Feed
- New SCADA System

WASTEWATER PROFESSIONALS

Gary ReVoir, PE

Technical Advisor

Mr. ReVoir has extensive experience in the water and wastewater arena. This experience covers a full range of wastewater collection, transmission, treatment and effluent disposal planning, as well as water supply, treatment and distribution. It also includes the areas of funding, permitting, final design, construction administration, start-up, and project management with emphasis on advanced treatment processes.

Education

B.S., Environmental Engineering, University of Florida 1988

M.S., Environmental Engineering, University of Central Florida 1995

Registration/Certifications

Professional Engineer, Florida, No. [redacted]

Years of Experience

24

EXPERIENCE

Sand Lake Road 24-inch Force Main Replacement, Orange County Utilities, Orlando, Florida. Project Manager for the replacement of 7,700 linear feet of 24-inch diameter PVC wastewater force main and 2,100 linear feet of 30-inch diameter DR11 wastewater force main along the north side of Sand Lake Road. This project was constructed within FDOT right-of-way. Services included preliminary engineering, survey, preparation of construction documents, permitting, bidding and general construction administration.

Cape Canaveral Reclaimed Water Main, City of Cape Canaveral, Florida. Project Manager overseeing the design and construction of a new reclaimed water transmission main from the City of Cape Canaveral's WWTF to the City of Cocoa Beach's reclaimed water repump facility. Project consisted of approximately 1,500 linear feet of 16-inch diameter and 9,000 linear feet of 12-inch diameter transmission main along US A1A within FDOT right-of-way in the City of Cape Canaveral to inter-connect the two City's reclaimed water systems.

Plantation Key Colony MBR Wastewater Treatment Plant, Village of Islamorada, Florida. Project Manager and Lead Technical Engineer. The scope of services for this project included providing planning, design, permitting and construction administration services as part of a design/build team for a new 0.355 MGD advanced wastewater treatment facility utilizing the submerged membrane bioreactor technology.

Iron Bridge Regional Water Reclamation Facility, City of Orlando, Florida. Project Manager. The scope of services for this project included the planning, permitting and final design services to convert, with rerating and expansion, a 24.0 MGD-AADF AWT process to a 40.0 MGD-AADF AWT process. The treatment facility included a full 5-stage modified Bardenpho advanced biological nutrient removal treatment system with tertiary filtration and high-level disinfection facilities for reclaimed water production.

Reedy Creek Wastewater Treatment Facility, Reedy Creek, Florida. Client Manager/Project Manager. The scope of services included the capacity rerating, permitting and preliminary design for the expansion of the existing 15.0 MGD-AADF AWT treatment facility to 20.0 MGD-AADF AWT. The treatment facility included a full 5-stage modified Bardenpho advanced biological nutrient removal treatment system with tertiary filtration and high-level disinfection facilities for reclaimed water production.

Gary ReVoir, PE (continued)

Crest Avenue Wastewater Treatment Plant Expansion, City of Winter Garden, Florida. Client Manager/Project Manager. The scope of services included the planning, design, permitting and final design services of a treatment plant expansion form 2.0 MGD to 4.0 MGD. The treatment facility included a full 5-stage modified Bardenpho advanced biological nutrient removal treatment system with tertiary filtration and high-level disinfection facilities for reclaimed water production.

Wastewater Treatment Plant, Northport, Florida. Project Manager/Project Engineer for the planning, design, permitting and construction administration of City's treatment plant expansion from 1.0 MGD to 1.5 MGD.

Southport Wastewater Treatment Plant, Port St. Lucie, Florida. Project Manager/Project Engineer for the planning, design, financial assistance, permitting and construction administration of the City's Southport wastewater treatment plant expansion from 2.2 MGD to 2.8 MGD.

BVL AWT Wastewater Treatment Plant, Buenaventura Lakes, Florida. Project Manager/Project Engineer for the planning, design, permitting and construction administration of a treatment plant expansion from 1.5 MGD up to 1.8 MGD the treatment facility included a full 5-stage modified Bardenpho advanced biological nutrient removal treatment system with tertiary facilities for reclaimed water production.

Wastewater Treatment Facility, Ocoee, Florida. Project Engineer for the planning, design, financial assistance, permitting and construction administration for a treatment plant expansion and upgrade to 2.0 MGD utilizing advanced secondary treatment, modified Ludzack-Ettinger (MLE) process.

South Bermuda Water Reclamation Facility, Kissimmee, Florida. Project Engineer responsible for preparing a capacity rerating study to support a permitting request to increase the design and permitted treatment capacity of the City of Kissimmee's South Bermuda WWTP from 6.0 MGD to 7.0 MGD.

UCCNSB AWT Wastewater Treatment Facility, New Smyrna Beach, Florida. Project Engineer for the planning, design, permitting and construction administration of a new $17 million treatment plant design for 6.0 MGD with full 5-stage modified Bardenpho advanced treatment nutrient removal facilities with tertiary treatment facilities for reclaimed water production.

Food Waste Composting Facility Improvements –Wastewater Treatment Plant, Reedy Creek, Florida. Project Manager for the new food waste composting system improvements at the RCID WWTF. The project was executed in the design-build delivery method. The project consisted of constructing three "in-vessel" type composting units for processing or treatment of food waste. The project was constructed at the WWTP with the ultimate plans to initiate processing of the wastewater biosolids into the composting units as well as food waste.

Lime Stabilization Improvements, City of Inverness, Florida. Project Manager for a new lime stabilization facility for the City of Inverness' WWTF. The project included the design and construction administration of a new Class "B" lime stabilization facilities. The new facilities included a liquid lime storage tank, two new sludge/lime mixing stabilization basins and a truck loading station.

Winter Garden Water and Wastewater Master Plan Update, Winter Garden, Florida. Project Manager and technical leader. Scope of services included updating the 1996 Water and Wastewater Master Plan. The project included revisions to service area, updated wastewater flows and potable water demands since 1996, and revised flow and water daemon projections. The report included revised text related to alternatives for improvements and a revised Capital Improvements program.

Jonathan D. Shimko

Water/Wastewater Manager

Jonathan Shimko develops, manages, and executes environmental, water and wastewater projects from Tetra Tech's Pittsburgh, Pennsylvania Office. Mr. Shimko specializes in water and wastewater treatment process, design, implementation and operation. He is experienced in environmental permitting including NPDES, Water Quality Management, Waste Management, and Erosion and Sedimentation Control. Mr. Shimko has considerable experience in flow monitoring including sanitary and storm drainage, and streams. He also specializes in water and wastewater sampling and testing.

Mr. Shimko is a licensed as Wastewater Treatment Plant Operator with over 10 years of plant operating experience. Providing functional and operator friendly designs and operation systems is a priority to Mr.Shimko. He has been responsible for operation, maintenance, quality control, collection and discharge of wastewaters; preparation and submittal of reports for permit compliance monitoring and approval; responsible for project management of wastewater treatment contracts; and has worked on treatment plant design and construction activities on numerous wastewater treatment systems and technologies.

Education

B.S. Environmental Science, Slippery Rock University, 2003

Mechanical Engineering, Geneva College, Beaver Falls, PA

Registration/Certifications

Certified Wastewater Systems Operator, Pennsylvania, No. [redacted]

Certified Water Systems Operator, Pennsylvania, No. [redacted]

Years of Experience

13

EXPERIENCE

Senior Environmental Specialist; Allegheny Energy, Inc.; Hatfield Power Station Sewage Treatment Study; Greene County, Pennsylvania. Evaluation of on-site and off-site sewage treatment alternatives to increase treatment capacity to handle an increase in the station's workforce. Completed sewage treatment investigation including the feasibility of alternative sewage treatment methods and associated construction costs. This included consulting local publically owned treatment works and venders.

Senior Project Environmental Specialist; GenOn Energy, Inc.; Power Station Wastewater Discharge Pipeline; Armstrong County, Pennsylvania. Performed permitting, design, construction monitoring, and construction management of a 15-mile pipeline project. Assisted in the design for a filtration system used in the pipeline pigging process. Design work included calculations, cost estimates, permitting support, and design drawings.

Task Manager; GenOn Energy, Inc.; Chem-Mod Pilot Study; Conemaugh Power Station, Indiana County, Pennsylvania. Assisted GenOn with a pilot study to determine the feasibility of applying a coal amendment prior to combustion in order to reduce mercury emissions in the flue gas. Study included the development of mass balance calculations and predictive models to determine air quality impacts and resulting effects on the wastewater effluent from the Flue Gas Desulfurization (FGD) system. Study considered application rates of the amendment, coal feed rates, FGD blowdown scenarios, NPDES effluent limits and air emissions.

Jonathan Shimko (continued)

Senior Project Environmental Specialist; GenOn Energy, Inc. and Kirkpatrick & Lockhart Preston Gates Ellis LLP; Power Plant Wastewater Engineering and Design; Indiana County, Pennsylvania. Wastewater plant engineering and design at a GenOn Generating Station. Developed preliminary design of a wastewater treatment system for cooling tower blowdown. Coordinated design and treatability work with subconsultants. Prepared Water Quality Management Permit Application and Design Engineer's Report. Prepared modification documents for the Station's NPDES Permit. Assisted in the preparation of technical specifications and bid documents for competitive bidding. Coordinated the completed construction package issued to the winning contractor awarded the job. Provided construction management support and reviewed contractor submittals. Coordinated the development of the final record drawing package and operation and maintenance documents.

Project Manager; Dominion Resources Services, Inc.; Pumped Storage Power Station Wastewater Treatment Plant; Bath County, Virginia. Conducted a feasibility study to assess potential modifications to the existing sanitary wastewater treatment plant and full replacement of the system. Assessed facility modifications and/or replacements in an effort to reduce operations and maintenance costs, maintain regulatory compliance, and increase safety. Developed alternative solutions, prepared engineering, capital and operating costs, and provided a matrix that compares these alternatives and provided recommendations to allow Dominion to make an informed decision on the appropriate course of action.

Environmental Scientist/Team Leader; Allegheny County Sanitary Authority (ALCOSAN); Combined Sewer Overflow Study Projects; Pittsburgh, Pennsylvania. Provided sanitary sewer flow monitoring services. Performed field investigations to find suitable monitoring sites, installed and maintained monitoring equipment, conduct on-site data quality reviews, and provided data analysis and graphs. Conducted storm flow monitoring on combined sewer overflows. Performed stream flow monitoring and collected flow monitoring and modeling data. Experienced in grab and composite sample collection of wastewater, stream water, storm water and potable water. Assisted with designing and implementing sampling and monitoring plans for combined sewer overflow studies. Team leader for stream and storm sampling activities.

Senior Environmental Specialist; Pennsylvania Turnpike Commission (PTC); Allegheny Tunnel Wastewater Improvements; Somerset County, Pennsylvania. Assisted with the design of a sanitary sewer system for the maintenance facility at the Allegheny Tunnel. Developed construction plans and details and provided construction QA/QC services.

Senior Environmental Specialist; Pennsylvania Turnpike Commission (PTC); Lawn Service Plaza WWTP Closure Plan; Lawn, Pennsylvania. Developed a closure plan for the wastewater treatment plant at the Lawn Service Plaza for approval by The PaDEP. The plan included sequence of the shutdown operation and a waste management plan.

Senior Project Environmental Specialist; Allegheny County Sanitary Authority (ALCOSAN); Dooker Hollow Stream Mitigation Project; Pittsburgh, Pennsylvania. Assisting Sci-Tek, Inc. (Sci-Tek) to develop a design plan for removing the Acid Mine Drainage (AMD) from ALCOSAN's combined sewer system and remediating the AMD for reuse as irrigation water for the golf course. Assisting with development of feasible treatment alternatives, construction specifications, and opinion of probable construction costs, and permit documents.

Task Manager; West Virginia Division of Corrections (WVDOC); Wastewater Treatment Plant Improvement Projects; Huttonsville and Anthony, West Virginia. Assisted with design and development of construction documents for the implementation of improvements to the Huttonsville and Anthony Correctional Centers. Improvements included a new sanitary pumping station, intake channel screening equipment, back-up generator, grease management, and new aeration pumps and blowers. Provided wastewater treatment plant operator guidance to improve wastewater treatment at the facilities.

Frank Johns, PE

Technical Advisor / National Practice Leader - Industrial Wastewater

Mr. Johns has over 35 years of experience in the planning and design of water and wastewater treatment systems and groundwater and soil remediation systems. Throughout his career, he has served in a wide variety of technical and managerial roles, including expert witness, technical advisor, project manager, design engineer, construction inspector, and operations specialist. From experience gained during the construction and operation of these systems, Mr. Johns offers his clients an added insight into the potential challenges raised during implementation of treatment and remediation technologies. He has demonstrated experience in a complete spectrum of facility evaluations and designs, and offers specialized expertise in many of the advanced processes such as ion exchange, granular activated carbon, ozonation, reverse osmosis, and ultraviolet light enhanced oxidation for water treatment, and low temperature thermal desorption for soil treatment, as well as in situ techniques. Mr. Johns is the Director of Industrial Water Management for Tetra Tech. In this role, he is responsible for developing and maintaining our technical expertise related to industrial water management projects. In addition, he is project manager for several process design, water and wastewater, and environmental remediation projects.

Education

MS, Environmental Engineering, Stanford University, 1977

BS, Civil Engineering, Stanford University, 1977

Registration/Certifications

Professional Engineer:

AR, CA, CO, ID, KS, MI, MO, OK, OR, and WY

Project Management, PM100, 200, and 300, Tetra Tech EC

Advanced Management Program, TSM Business School, Enschede, Netherlands

Project Management, American Consulting Engineers Council

Years of Experience

37

EXPERIENCE

Wastewater Treatment Plant Evaluations, General Motors Worldwide Facilities Group, Detroit, MI. Senior Project Engineer – Project manager and wastewater process engineer for the evaluation of 10 wastewater treatment plants at General Motors facilities in Michigan, Ohio, and Wisconsin. The project involves the evaluation of the wastewater process, equipment, and controls to identify possible projects for inclusion in the budget for the next fiscal year. Site visits were conducted and operators were interviewed to identify potential projects. Projects were ranked based on impact on safety, compliance, and plant reliability.

Wastewater Treatment Plant Upgrade Design, Meridian Metropolitan District, Englewood, CO. Senior Project Engineer – Project engineer for the design of an upgrade to a wastewater treatment plant to meet more stringent discharge limits. The current plant was a lagoon system unable to meet the tighter discharge limits. The new plant included an extended air mechanical plant within the same limits as the existing plant.

Water Quality Standards and Wastewater Discharge Permit, Tri-State Generation and Transmission Association, Nucla, CO. Senior Project Engineer – Supported an electric utility in regard to a NPDES permit at a power generating station. Project involved preparing testimony for modifications to water quality standards for the river in which the facility discharged cooling water blowdown and other process wastewater. Testimony considered natural water quality conditions as a basis for the proposed modifications. Provided ongoing support in managing a database of temperatures in the plant discharge and the receiving stream upstream and downstream from the discharge.

Frank Johns, PE (continued)

Industrial Pretreatment Program, F.E. Warren AFB, Cheyenne, WY. Senior Project Engineer – Senior project advisor for a wastewater source study and the development of a best management practices (BMP) plan, both completed as part of the pretreatment permit that the F.E. Warren Air Force Base (AFB) has with the City of Cheyenne, WY. The source study involved the identification and monitoring of various industrial wastewater sources at the Base. Wastewater samples were collected and flows were measured as part of the monitoring program to determine potential areas that may have led to exceedances of certain permit parameters. The BMP plan was prepared to provide information and key elements used to minimize or eliminate the potential for spills or discharges from FEW AFB industrial shops to the sanitary sewer. Posters calling out key aspects of the BPM plan were prepared and provided to each shop as a compliance tool.

Wastewater Treatment Plant UV Disinfection System Design, Centennial Water and Sanitation District, Highlands Ranch, CO. Project Manager– Project manager for the design of a UV disinfection system at the Marcy Gulch wastewater treatment plant for the Centennial Water and Sanitation District in Highlands Ranch, Colorado. The design included modifications to the existing chlorine contact basins to allow the installation of a UV disinfection system. The project included the identification and evaluation of alternative UV systems, preparation of documents for the owner to pre-purchase the UV disinfection equipment, and design of modifications to the existing process, structural, and electrical systems.

Wastewater Treatment Expert, Confidential Client, CA. Retained as an expert for a case involving the engineering design of modifications to a wastewater treatment plant. Services include the evaluation of the design based on a review of operation and monitoring data and discussions with operations personnel, and the development of recommendations to resolve issues between the city and the engineering firm.

Wastewater Treatment Expert, Confidential Client, Waterbury, CT. Retained as an expert for a case involving an alleged NPDES violation from a specialty chemical manufacturer. Services include the evaluation of the wastewater treatment system design and operation and monitoring data.

Wastewater Treatment Expert, Confidential Client, Denver, CO. Retained as an expert in regard to determining the potential impacts of operating a rapid infiltration basin (RIB) for wastewater disposal on the land and the probable costs for remediation of soil and groundwater. The assessment was conducted to assist in determining whether the property was damaged by the placement of the RIB on the property.

Wastewater Treatment Expert, Confidential Client, Elsie, NE. Served as an expert in regard to the location of a wastewater treatment lagoon in Nebraska. The property owner did not want the lagoon located so that it would impact their property. The assessment included a review of design criteria and procedures and wetlands considerations.

Evaluation of Wastewater Impacts, Confidential Client, IA. Project Manager – Served as project manager and lead engineer on the evaluation of potential impacts on water supply wells from a wastewater treatment facility. There were concerns that wastewater being treated in an aerated lagoon was impacting groundwater. Analyzed hydrogeology and water quality information to determine that wells were not impacted.

Wastewater Treatment Plant Evaluation, Confidential Client, Boulder, CO. Project Engineer – Performed an operation evaluation for an activated sludge process at a pharmaceutical manufacturing plant. The evaluation was conducted due to concerns with plant performance during cold weather. The evaluation not only considered the impacts of changes to biomass and solids retention time on effluent quality, but also had to consider effects on air quality from the aeration basins.

Michael Schmidt, PE

Technical Advisor

Mr. Schmidt specializes in the planning, design, operations, and management on a wide variety of water, wastewater, and stormwater projects. As Design Group Leader, his expertise consists of municipal and industrial wastewater and sludge projects both nationally and abroad. In addition to being a registered professional engineer in Alabama, Florida, and Kentucky, he is a certified wastewater operator in Tennessee.

EXPERIENCE

Snapfinger Creek Advanced Wastewater Treatment Plant Phase II, Construction Management, DeKalb County, Georgia. Resident Engineer of Construction Management of 54 MGD MBR addition. Services include pre-construction services including plan review, construction cost and scheduling preparation, and construction management services including on-site inspection, MIS contract management, and overall project management.

Water, Wastewater, and Stormwater System Contract Operations, Bluegrass Station, Lexington, Kentucky, October 2011 to Present. Project Manager responsible for the operation and maintenance of the water, wastewater, and stormwater utility systems at the Bluegrass Station, a state-owned business park operated by the Kentucky Department of Military Affairs (DMA) with 27 commercial tenants that employ approximately 2,600 people. The utility systems operated under contract for the DMA include a 100,000 GPD WWTP, a wastewater lift station, two stormwater outfalls, and the water distribution system, which includes monthly reading of 84 water meters. Services provided include management, administration, routine operations and maintenance, sampling, laboratory testing, and regulatory reporting.

Wastewater Treatment Plant Upgrades, Major Automotive Manufacturer, Ingersoll, Ontario. As Senior Process Engineer, he prepared the Concept Design Report that evaluated upgrade alternatives for a 0.5 MGD industrial wastewater treatment facility at an automotive assembly plant. Process alternatives for removal of metals (primarily zinc and fluoride) and oil and grease were developed and evaluated, including various chemical precipitation and adsorption technologies. As part of the implementation of the initial phases of the recommended improvements, he designed two new 500,000-gallon bolted steel wastewater storage tanks and associated chemical feed upgrades. Mr. Schmidt also managed the final design of the recommended improvements, which include new inclined plate clarifiers with a plate-and-frame filter press for sludge dewatering in a new 21m x 42m wastewater treatment plant building consisting of an entry vestibule, electrical room, restroom, tool room, break room, control room, filter press room, mechanical room, and high-bay area for the new treatment process equipment. These facilities are being bid and constructed in phases in 2012 and 2013.

Education

Master of Engineering, Environmental Systems Engineering, Clemson University, December 1992

Bachelor of Engineering, Chemical and Biomedical Engineering (Summa Cum Laude), Vanderbilt University, May 1990

Advanced Pretreatment Training Course, WEF-EPA, June 1999

Registration/Certifications

Professional Engineer, Georgia, No. [redacted]

Professional Engineer, Alabama, 2008, No. [redacted]

Professional Engineer, Kentucky, 2009, No. [redacted]

Professional Engineer, Florida, 1997, No. [redacted]

Grade 4 Wastewater Treatment Plant Operator, Tennessee

Years of Experience

21

Michael Schmidt, PE (continued)

Sanitary Sewer Improvements, City of Huntsville, Alabama. Senior Engineer responsible for reviewing master planning, preliminary design, and final design documents for compliance with engineering standards and overall quality control of final deliverables on a variety of sanitary sewer improvement projects for the City. Work included the Western Area sewer improvements with over 8 miles of sanitary sewer ranging in size from 12 to 42 inches, over 6 miles of 20-inch force main (FM), and an 18.8 MGD regional pump station. Other projects included the Beadle Lane Pump Station (PS), the Flint River PS and FM, the Goose Creek PS and FM, the Valleybrook PS, the Squaw Valley Interceptor, the Knox Creek Gravity Sewer, and the 2008 Sanitary Sewer Rehabilitation.

- **Beadle Lane Sanitary Sewer and Pump Station, Huntsville, Alabama.** Assisted with master planning activities for the Beadle Lane drainage basin, design of 4,200 feet of 18-inch sanitary sewer, a triplex pump station and 3,700 feet of 10-inch force main and coordination with development activities. Construction administration services included bidding services, monthly progress meeting, shop drawing reviews and full/part time inspection services
- **Western Area Pumping Station, Gravity Sewer, and Force Main, City of Huntsville, Alabama.** Senior engineer responsible for reviewing master planning, preliminary design, and final design documents for compliance with engineering standards and overall quality control of final deliverables for the Western Area sewer improvements, which included over 8 miles of sanitary sewer ranging in size from 12" to 42", over 6 miles of 20" force main, and an 18.8 MGD regional pump station.

Birmingham Wastewater Treatment Plant Improvements, Kansas City, Missouri. Senior Process Engineer for the design of chlorination and dechlorination improvements at the 24 MGD (peak) plant. Improvements were required to meet new seasonal E. coli effluent permit limits by January 2012. The facilities feed sodium hypochlorite at 12.5% concentration from bulk storage tanks to a chlorine contact basin, which was upgraded with new injection mixers and baffles. For dechlorination, sodium bisulfite at 40 percent is fed from chemical totes to a point downstream of the contact basin.

Big Cove Wastewater Treatment Plant Expansion, City of Huntsville, Alabama. Senior Process Engineer and Technical Lead for the plant's expansion from 2 to 4 MGD. Improvements included new influent pumps, new mechanical screens, a flow splitter box, an anaerobic basin for biological phosphorus removal, a new aeration basin, a new secondary clarifier, a new RAS/WAS pump station, new chlorination and dechlorination feed systems, and additional sludge drying beds. Design also included master planning the site for future anoxic basins and a build-out capacity of 8 MGD.

Riley Maze Creek Wastewater Treatment Plant Improvements, Arab Sewer Board, Arab, Alabama. Senior Design Engineer for the improvements to the 0.8 MGD plant. Improvements included influent pump station improvements, a new mechanical screen, grit system improvements, new clarifier mechanisms, new RAS/WAS pumps, new scum pumps, new NPW pumps, a new chlorine contact basin, and new chlorination and dechlorination feed systems.

Gilliam Creek Wastewater Treatment Plant Improvements, Arab Sewer Board, Arab, Alabama. Senior Design Engineer for the improvements to the 0.83 MGD plant. Improvements included influent pump station improvements, a new mechanical screen, new scum pumps, a new chlorine contact basin, new chlorination and dechlorination feed systems, and electrical and instrumentation upgrades.

Wastewater Treatment Asset Sustainment Program and Powerhouse Asset Sustainment Program, Major Automotive Manufacturer, Spring Hill, Tennessee. Site Project Manager responsible for the identification and implementation of the following wastewater and powerhouse improvement projects that were implemented by Tetra Tech as the Owner's Design-Build Program Manager.

Sean Scuras, PE, Ph.D., BCEE

Technical Advisor / National Practice Leader - Municipal Wastewater

Dr. Scuras began working as a water and wastewater engineer in 1983 and has worked with nutrient removal processes since 1989. He has experience in wastewater treatment design, operation, and research. He is a wastewater process specialist skilled in process modeling, analysis of alternative processes, preliminary and final process design engineering and process optimization, troubleshooting, and start-up. Dr. Scuras has conducted energy audits and comprehensive performance evaluations, developed corrective action plans, and designed engineering upgrades to improve wastewater treatment plant (WWTP) performance in areas such as nutrient removal, disinfection, hydraulic capacity, and energy efficiency.

Over his 31 year career, he has gained wastewater engineering experience ranging from sewer mapping and sewer system evaluation surveys to design of physical/ chemical processes for advanced wastewater treatment to teaching and research on biological process optimization and modeling. He developed the Tetra Tech (RTW) Water Chemistry, Process, and Corrosion Model that has been marketed by AWWA for 20 years. A former licensed WWTP operator and process control specialist, he also holds an appointment as Adjunct Assistant Professor with Clemson University.

Currently Dr. Scuras is serving as Tetra Tech's National Practice Leader for Municipal Wastewater.

EXPERIENCE

Arcelor Mittal Monessen PA Coking Facility WWTP Training. Senior Process Engineer. Dr. Scuras provided operator training and is assisting with performance testing and process optimization at this 144,000 gpd MBR WWTP at a coke making facility. This is the first MBR application for coke making wastewater which has high concentrations of COD and nitrogen and uses an MLE process configuration variation for denitrification.

Pilgrim's Pride Mt Pleasant TX High Strength WWTP Training and Startup. Project Manager. Dr. Scuras provided operator training and is assisting with startup planning and execution for this 4.5 mgd WWTP at a chicken processing facility. The WWTP receives high strength wastewater (similar to municipal centrate) and uses a combination of anaerobic and activated sludge process approaches for treatment.

Charles Town WV Tuscawilla MBR WWTP Evaluation. Project Manager. Dr. Scuras performed a comprehensive plant evaluation for this 0.5 mgd membrane bioreactor (MBR) facility to determine causes for poor nitrogen removal and excessive chemical usage. Provided recommendations for operational/control modifications that have resulting in improved nitrogen removal performance and significant decreases in supplemental carbon feed and poly-aluminum chloride usage.

Education

Ph.D. 5/2004. Clemson University, Clemson, SC. Environmental Engineering and Science.

M.S. 5/1992. University of Colorado, Denver, CO. Civil Engineering.

B.S. 5/1983. Southern Illinois University, Carbondale, IL. Engineering.

Other Relevant Education and Training

Introduction to Biowin Process Simulation, 2008. Envirosim Corporation.

Activated Sludge Process Control, 1993. Short Course by Dept. of Civil Engineering, Colorado State University.

Blower Operation and Control, 1990. Compressor Controls Corp.

Operation, Control , and Management of Activated Sludge Plants, 1986. Seminar by Dept. of Civil and Environmental Engineering, Vanderbilt University and AWARE

Registration/Certifications

Professional Engineer No. [redacted] in State of Colorado

Years of Experience

30

TETRA TECH

Sean Scuras, PE, Ph.D., BCEE (continued)

Municipal WWTP Controls Improvements, Augusta, GA. Dr. Scuras directed on-site controls improvements and developed control strategies for aeration and other control systems at the 46 MGD Messerly WWTP. Aeration improvements included DO and ammonia analyzer control for air distribution to the MLE activated sludge basins and "most open valve" control along with intelligent blower selection for operation of multiple blower sizes.

Tyson Dakota City WWTP Performance Evaluation. Project Manager. Dr. Scuras performed an evaluation of this 4 mgd WWTP at a beef processing facility to determine the cause of effluent quality issues. Focus was on nitrification and denitrification processes and effluent solids. Recommended modified operating practices that have stabilized performance within limits. Also identified low cost plant modification that will add treatment capacity and operational flexibility.

Flagstaff AZ Wildcat Hill WWTP Nitrogen Removal Performance Evaluation. Project Manager – Dr. Scuras is Project Manager for a comprehensive performance evaluation to determine performance limitations and provide recommendations for improved nitrogen removal at this 6 MGD IFAS facility. Project is part of a comprehensive plan developed by Tetra Tech to assist Flagstaff with consent order compliance. Recommended improvements include installation of ammonia and nitrate probes for improved process control, supplemental carbon feed facilities, and improved management of return flows from sludge processing.

Suncor Refinery WWTP Improvements Evaluation. Senior Process Engineer – For this Denver area refinery, Dr. Scuras evaluated 5 options for improvements to treatment capacity, application of membranes to improve mercury, arsenic, and selenium removal, and add nutrient removal capability for compliance with new Colorado regulations. Alternatives included MBR and tertiary membrane alternatives, IFAS, and MBBR.

Abdereen Proving Ground, Edgewood WWTP Nutrient Removal Upgrade Value Engineering Analysis. Senior Process Engineer – Dr. Scuras provided technical evaluation of the design for this nutrient removal upgrade and refurbishment project including MBBR and denitrification filters. VE focus was on secondary and tertiary clarifier sizing and reliability.

Kailua WWTP, Honolulu HI Energy Improvements Phase 2. Senior Process Engineer– As Senior Process Engineer for this ESCO project, Dr. Scuras provided design guidance and review for aeration system improvements to this 15 MGD trickling filter/solids contact process including instrumentation, diffuser system, and blower improvements (including high speed "turbo" blowers) to reduce energy consumption. Project pays for itself with the energy savings.

Howard F Curren WRF Aeration Upgrades and Denitrification. Project Manager – Dr. Scuras is Project Manager for process engineering and process modeling work to support aeration improvements and configuration changes to provide denitrification capability in the activated sludge portion of this 96 MGD facility in Tampa FL. Work includes GPS-X process modeling to define oxygen demands under several operating scenarios and to optimize on-off and cyclical aeration schemes to maximize denitrification within the aeration basins to save energy and reduce the need and cost for external carbon source for supplemental denitrification filters.

Municipal WWTP Controls Improvements, Augusta, GA. Senior Process Engineer – Dr. Scuras directed on-site controls improvements and developed control strategies for aeration and other control systems at the 46 MGD Messerly WWTP. Aeration improvements included DO and ammonia analyzer control for air distribution to the MLE activated sludge basins and "most open valve" control along with intelligent blower selection for operation of multiple blower sizes.

Brian Rubel, PE

Technical Advisor

Mr. Rubel is a Senior Project Manager and Hydraulics/Hydrology Specialist. He specializes in stormwater, flow monitoring, utility master planning, and infiltration/inflow (I/I) control, including stormwater and sanitary sewer overflow control, combined sewer overflow control, and floodplain analyses. Mr. Rubel is also an Operations Manager, overseeing client satisfaction and project management in the Ann Arbor, Detroit, Port Huron, and Toledo offices.

Mr. Rubel's master planning services include the preparation of complex computer models for drinking water systems.

Mr. Rubel holds an adjunct position at the University of Michigan's Department of Civil and Environmental Engineering. Under this appointment, he teaches a hydraulic design course that includes curriculum on preparing water distribution system models.

Education

M.S.E., University of Michigan, June 1990

B.S.E., University of Michigan, April 1989

Registration/Certifications

Professional Engineer:

Michigan, 1993, No. [redacted]

Ohio, 2000, No. [redacted]

Michigan Certified Industrial Stormwater Operation, 2003

Project Management Professional, I2004

Years of Experience

22

EXPERIENCE

Energy Audit, Northfield Township, Michigan. Prepared study to document the energy savings expected from insulation, pump VFD installation and aeration improvements. Subsequently prepared successful rebate applications from Consumers Energy.

Design-Build Improvements, Major Automotive Manufacturer. Led design-build projects to complete over $400,000 in improvements to the industrial pretreatment plant and stormwater treatment plant. Supervised design and subsequent subcontractor construction. Improvements included new pumps, rehabilitation of existing pumps and motors, baffles, and instrumentation.

Industrial Pretreatment Master Plan, Major Automotive Manufacturer. Led master plan study to document long-term needs for facility's industrial pretreatment process and stormwater treatment process. Developed treatment alternatives and capital improvement costs for future years.

WWTP Facilities Evaluation, Saline, Michigan. Project Manager for study to identify immediate needs at Saline's WWTP. Study evaluated digester improvements, septage receiving improvements, and structure improvements to arrest building settlement. Documented improvements in report and assisted City with obtaining MDEQ S2 grant funding for planning and design. Subsequently completed an SRF Project Plan and made city eligible for low interest loan fund for improvements.

Biosolid Improvements, Saline, Michigan. Project Manager for the design and reconstruction of $1.4 million in improvements to the WWTP digester system including a new boiler, heat exchanger, and instrumentation.

Wastewater Treatment Plant (WWTP) Effluent Flow Meter, Northfield Township, Michigan. Project Manager and Designer of effluent flow meter for WWTP. Flow meter was needed to meet the needs of a facility audit conducted by the

Brian Rubel, PE (continued)

Michigan Department of Environmental Quality.

Wastewater Treatment Plant (WWTP) Energy Audit, Adrian, Michigan. Project Manager for completion of an energy audit at City's WWTP. Audit identified cost saving measures and likely grant funding potential and evaluated the potential for the facility to abandon chemical nutrient removal by use of biological nutrient removal.

Wastewater Treatment Plant (WWTP) Blower Improvements, Tecumseh, Michigan. Project Manager for the completion of a blower evaluation at City's WWTP. Evaluation identified options for replacing 35-year old equipment with newer, more efficient blowers. Procured MDEQ's S2 grant to assist with planning and design of the same blower improvements. Subsequently prepared SRF project plan and completed construction. Successfully submitted a green business case evaluation that resulted in a $200,000 grant and $50,000 in rebates providing almost 70% of the project cost.

Incinerator Evaluation, Warren, Michigan. Project Manager for completion of an incinerator evaluation ahead of pending regulations. Evaluation included air testing to assess compliance. Study also identified additional measures needed for facility to remain in compliance.

Infiltration / Inflow (I/I) Control, Adrian Township, Michigan. Project Manager for an I/I control and education program. Analyzed existing records to draw significant conclusions about rates and sources of I/I. A comprehensive flow monitoring program based on the results of the initial step was subsequently implemented. The eight unit flow monitoring program identified areas of high I/I and developed inferences as to their likely sources. Program demonstrated that a majority of rain-induced I/I originated from one isolated area, giving the Township a focused remediation plan.

Infiltration / Inflow (I/I) Control Study, Lapeer, Michigan. Project Manager for a sanitary sewer I/I control study. Analyzed existing information to optimize data collection program. Designed seven flow-monitoring studies that identified locations of high I/I. Made several findings that were contrary to community's suspicions prior to beginning project. Subsequently conducted SSES activities to target locations of high I/I rates. Follow-up actions have identified over 100 sources of I/I. Follow-up flow monitoring demonstrated that significant I/I has been removed from the system. A detailed report was prepared that qualified the city for Michigan's low interest loan (SRF) program for construction costs.

Flow Monitoring and Infiltration / Inflow (I/I) Control, Pontiac, Michigan. Managed project to measure flows (19 instruments) in the city's collection system. Analyzed data and developed recommendations ($30 million in project costs) to control I/I. Utilized XP-SWMM computer model for analysis. Unique findings and aspects were: determined that an existing flow split structure created high energy losses that caused excessively high depths of flow; utilized State of Michigan's revised SSO policy to conceive excess flow treatment facilities to control overflow quality; and identified that a SSES will be part of the cost-effective control solution.

Sanitary Sewer Evaluation Survey (SSES), St. Clair Shores, Michigan. Project Manager for a SSES for an eight square mile area. Survey included smoke testing, manhole inspector, sanitary sewer flow monitoring, sump pump monitoring, and rainfall simulation. Subsequently developed cost-effective analyses for system rehabilitation. Report was approved by the Michigan Department of Environmental Quality and assisted the community with qualifying for a State Revolving Fund loan.

Infiltration / Inflow (I/I) Control, Northfield Township, Michigan. Project Manager for an I/I control and education program. Over 30 percent of Township residents participated, and many took voluntary measures to reduce I/I. Subsequently designed a private property inspection program for implementation by the Township.

John Toomey, PE

Technical Advisor

Mr. Toomey has over 34 years of responsible engineering experience in planning, design, and construction administration of various water and wastewater projects. He has extensive experience in the development of evaluation of wastewater treatment options and has written spreadsheet-based process software to predict the steady-state performance of 3, 4, and 5-stage biological nutrient removal system. Mr. Toomey has served the Cities of Winter Park, Mount Dora, Oldsmar, Tarpon Springs, and Haines City, as well as Orange and Seminole Counties, in planning, design, and implementation of various wastewater treatment programs.

Education

BSE, University of Central Florida, Environmental Engineering, Magna cum Laude

AET, Vermont Technical College, High Honors

Registration/Certifications

Professional Engineer, Florida, No. [redacted]

Years of Experience

34

EXPERIENCE

Bates Avenue WWTP Nitrogen Reduction Improvements, City of Eustis, Florida. Project Manager for the review and value engineering recommendations associated with compliance with the Wekiva Act. Alternative treatment options utilizing existing process basins were identified and the City selected an option that involves modifying existing process trains to facilitate the use of the step-feed activated sludge process. This concept resulted in a capital savings to the City of over $5,000,000 without sacrificing rated capacity or reliability.

Wastewater Treatment Plant: Process Evaluation and Rerating, Utilities Commission, City of New Smyrna Beach, Florida. A detailed analysis of flows, influent characteristics, and plant performance in conjunction with a computer modeling effort. This assignment resulted in increasing on WWTP capacity from 6.00 MGD to 7.00 MGD with only minor improvements.

James P. Snell Sub-Regional Wastewater Treatment Plant, Florida. Design, permitting, bidding, and construction phase services for a new WWTP with a design capacity of 1.25 MGD. The plant includes mechanical screening, flow equalization, anoxic and aerobic stages for partial denitrification, clarification, filtration, and disinfection. Also, sub-standard wet weather effluent storage facilities are included in the project along with an effluent distribution pumping system that includes a mixture of variable and constant speed pumping units.

Wastewater System Evaluation Study, City of Lakeland, Florida. A detailed study of the City's wastewater collection, treatment and disposal facilities for a 20-year planning period. The project included an evaluation of various regional and sub-regional treatment options as well as an evaluation of pretreatment alternatives for a high-strength industrial wastewater. Also, the project included a large computer model of the City's wastewater transmission system to evaluate various options under existing and projected flow conditions. A phased capital improvements plan was also developed as part of the project.

Greenwood Lakes Wastewater Treatment Plant Master Pump Station Replacement, Seminole County, Florida. Preliminary engineering, final design, permitting, bidding and construction phase services for the replacement of the master pump

John Toomey, PE (continued)

station at Greenwood Lakes WWTP along with other modifications that include replacement of scum pumping facilities, new aeration facilities for an aerated sludge holding tank and modifications to various stormwater system components. The project included a detailed evaluation of alternatives for addressing corrosion problems at the existing master pump station. Options considered during the preliminary engineering phase involved bypass pumping and rehabilitation and construction of new wet well structures via standard open-cut and caisson methods. Cast-in-place and pre-cast concrete options were also evaluated during preliminary design and both methods were included in the bidding documents, as well as options for open-cut and caisson methods of construction. Also, the project includes replacement of an out-dated variable speed control system for the master pump station.

Cape Canaveral Air Force Station Wastewater Treatment Plant Process Operation Study, Johnson Controls, Inc., Florida. Evaluation of influent and effluent characteristics along with each unit operation and process to determine if modifications and/or operational changes should be implemented to attain compliance with the regulatory agency effluent limits. The result of the analyses indicated that low wastewater flows in conjunction with relatively low influent BOD concentrations made it nearly impossible to obtain the anoxic conditions necessary for partial denitrification and compliance with nitrate limits. Subsequently, a variety of treatment process modifications were evaluated including phased rotor operation, the Modified Ludzack-Ettinger process and the Wuhrman process. The analyses resulted in recommending implementation of the Modified Ludzak-Ettinger process at an estimated capital cost of approximately $250,000. Further, the study provided several recommendations for operation modifications that will enhance plant performance. Also, a computer model that predicts steady-state performance of the recommended system was provided to Johnson Controls, Inc. to assist in operation of the plant once it was modified.

Wastewater Treatment Plan Expansion, City of Haines City, Florida. Planning and design phase services related to an upgrade and expansion of the City's existing wastewater treatment plant. The project includes an analysis of various wastewater treatment, effluent disposal and residuals handling alternatives along with a 201 Facilities Plan Update and final design activities. The new facilities included a 2.97-MGD wastewater treatment facility, which provides partial denitrification and advanced secondary levels of treatment of facilitate spray irrigation of effluent in groves and public access areas. The project also included additional residuals handling facilities and an extensive effluent distribution network.

Wastewater Treatment Plant Expansion, City of Deltona Lakes, Florida. A detailed analysis of flows, influent characteristics, effluent quality data and unit operations and processes to determine the most cost-effective method of meeting an effluent nitrate limit of 12 mg/1. The analysis also included an evaluation of residuals handling facilities to determine the most cost-effective method of complying with 40 CRF part 503.

Palmetto Wastewater Treatment and Effluent Disposal Master Plan, Florida. A comprehensive master planning effort for expansion of the city's 1.4 –MGD wastewater treatment plant and the implementation of an effluent reuse system. The recommended plan includes expanding the city's existing WWTF to provide a 2.0-MGD AWT facility to meet "Grizzle-Figg" effluent limits for wet-weather discharge to Terra Ceia Bay. The project also includes an effluent storage/distribution center and phased effluent distribution network.

Tarpon Springs Wastewater Treatment Plant Rerating Study, Florida. A detailed analysis of flows, influent characteristics, effluent quality data and existing unit operations and processes at the City's five stage ATW facility to determine if the existing facilities could meet the stringent effluent limits imposed by the Grizzle-Figg Bill. The results of the study indicated that only alum feed and dechlorination facilities would be required and that effluent limits for BOD, TSS, and TN could be met without modifying the existing WWTF process basins.

Thomas A. Allbaugh, PE, BCEE

Technical Advisor

Mr. Allbaugh has extensive experience in detailed design and project management for a broad spectrum of civil engineering projects including both design and construction of wastewater collection, pumping and treatment facilities, roads and bridges, and stormwater drainage and pumping. He is also responsible for providing technical oversight for the "front-end" and Division 1 portions of our standard specifications for construction projects and a number of technical specifications for process equipment.

Mr. Allbaugh also serves as Chief Engineer for the Infrastructure East Region of Tetra Tech, responsible for implementation of our quality processes.

Education

B.S., Civil Engineering, University of Kansas, 1974

Manhattan College Summer Institute for Secondary and Tertiary Treatment

Graduate Studies in Sanitary and Water Resources Engineering, University of Michigan and Eastern Michigan University

Registration/Certifications

Professional Engineer in the states of:

Michigan, 1979, No. [redacted]

Ohio, 2005, No. [redacted]

Florida, 2008, No [redacted]

Board Certified Environmental Engineer, 2011

Certified Construction Specifier, 1992

Years of Experience

37

EXPERIENCE

Fort Wayne Wastewater Treatment Plant, Fort Wayne, Indiana. Evaluated potential energy conservation measures including expanded use of digester gas to generate electricity, automation of the aeration blowers, modifications to the layout of the fine bubble aeration equipment, and biological phosphorus removal. Study recommendations are currently under consideration by City staff.

Munising Wastewater Treatment Plant, Munising, Michigan. Design-Build delivery of energy savings modifications to the plant including replacing mechanical oxidation ditch aerators with fine bubble diffusers and submersible mixers and associated mechanical and electrical work. Project will start up in the fall and is expected to reduce annual operating costs by more than $50,000.

Albion Wastewater Treatment Plant, Albion, Michigan. Project Manager. Complete design-build delivery of fine pore aeration equipment and modifications for biological phosphorus removal at the 2-MGD plant as part of a City-wide Energy Services Contract performed by an Energy Services Company.

Ypsilanti Wastewater Treatment Plant, Ypsilanti Community Utilities Authority (YCUA), Ypsilanti, Michigan. Project Manager. Evaluation, detailed design, and construction phases of an extensive energy saving and wastewater treatment process optimization project at the 46-MGD plant. The $59,000-study identified approximately $2 million in capital and process improvements that could result in $550,000 annual savings in aeration process control, HVAC operation, lighting systems. A number are under construction as of February 2010.

Ypsilanti Wastewater Treatment Plant, Ypsilanti Community Utilities Authority (YCUA), Ypsilanti, Michigan. Project Manager. Study, design, and construction phases of a 17-MGD expansion of the plant (currently 46-MGD), including flow equalization, grit removal and screening, aeration with biological phosphorus removal, air-water backwash tertiary filtration, and UV disinfection. Biosolids disposal is by fluid bed incineration with live bottom hoppers for truck loading to landfill as a backup. Total project cost $106M.

Dexter Wastewater Treatment Plant, Dexter, Michigan. Project Director. Expansion of existing plant including replacing RBCs with activated sludge, rehabilitation

Thomas Allbaugh, PE (continued)

of tertiary filters, and modifications to existing anaerobic digesters including sludge pumping and heating equipment, replacement of gas-lifters for mixing, and structural repairs to the floating cover.

Blue Plains Wastewater Treatment Plant, District of Columbia. Project Engineer. Study to determine the technical and economic feasibility of biological nutrient removal.

Detroit Wastewater Treatment Plant, Detroit, Michigan. Project Engineer. Analysis of the technical potential and economic ramifications of biological phosphorus removal and nitrification for this 805-MGD plant. Included extensive pure oxygen-activated sludge pilot testing of alternatives.

Jackson Wastewater Treatment Plant Upgrade, Jackson, Michigan. Project Manager. Wastewater treatment plant upgrade that included new grit and screening equipment, new aeration and fuel settling tanks, sludge storage facilities, and a plant-scale pilot study of biological phosphorus removal.

Brighton Wastewater Treatment Plant, Brighton, Michigan. Project Manager. Secondary treatment using an oxidation ditch and tertiary treatment in a reactor clarifier with two-stage land application for this 1.52-MGD plant.

Escanaba Wastewater Treatment Plant, Escanaba, Michigan. Project Manager. Replace existing floating digester cover and replace portions of the secondary treatment process aeration system. Responsible for an energy evaluation.

Menominee Paper Company Wastewater Treatment Facility, Menominee, Michigan. Project Manager. Design of a 1.1-MGD facility that directly discharges treated effluent from company to the Menominee River. Project involved pilot testing and analysis of aerobic packed towers (trickling filters), upflow anaerobic sludge blanket treatment systems, as well as the selected activated sludge process. New facilities include equalization, primary and final settling, aeration, and three KROFTA sand float combination DAF and sand filtration units for recycling water for re-use in the mill.

Northfield Township Wastewater Treatment Plant, Northfield Township, Michigan. Project Engineer. Design of 260,000-gallon flow equalization facility with new grit and screening equipment. Project also included dechlorination, office addition, replacement of a floating digester cover, and other related work.

Tecumseh Wastewater Treatment Plant, Tecumseh, Michigan. Project Engineer. Design of a conventional activated sludge treatment plant with nitrification. Anaerobic digesters provide fuel for an induction generator set for energy recovery. Digester gas is stored in a spiral-guided floating cover. Plant capacity – 2.3 MGD.

Wastewater Treatment Plant, Warren, Michigan. Project Engineer. Aeration equipment evaluation. Also evaluation, selection, and installation of two, 2-meter continuous belt filter presses for dewatering sludge.

Stephenson Wastewater Treatment Plant, Stephenson, Michigan. Project Engineer. Rehabilitation of existing anaerobic digester including installation of a spiral-type sludge heat exchanger, sludge circulation pump, and necessary pipes and valves at the plant. New sludge heating equipment replaced a system of hot water pipes that lined the inside of the anaerobic sludge digester. Pipes were inoperative due to leaking.

Lapeer Wastewater Treatment Plant, Lapeer, Michigan. Project Engineer. Sludge handling facilities for oxidation ditch wastewater treatment plant. System included centrifuges for thickening, aerobic storage, and drying beds with disposal by land application of either liquid or dry sludge.

Milan Wastewater Treatment Plant, Milan, Michigan. Project Engineer. Design and construction of plant expansion and improvements. BOD removal and nitrification were performed by rotating biological contactors. Rapid sand filtration was employed for tertiary treatment. Biosolids were stabilized by anaerobic digestion and then land applied as Class B.

Arthur Kuljian, Jr., PE, BCEE

Technical Advisor

Mr. Kuljian has extensive experience in the environmental engineering field working for consulting firms, U.S. EPA Region 6, and an institutional facility. He serves as Project Engineer and Project Manager on remedial design and treatment projects, industrial wastewater treatment plant designs, and regulatory agency permitting in Michigan, Illinois, Ohio, and Indiana. With a large international consulting firm, he served as project engineer on CERCLA remedial investigations and designs, industrial and municipal wastewater treatment plant designs, and a fast-track beach front water quality project for Montevideo, Uruguay. As Staff Engineer, he developed a Corporate QC Environmental Process Design Procedures Manual. With an owner, Mr. Kuljian managed facility's environmental activities including: conducting site contamination assessments and remedial studies and designs; designing process waste treatment facilities; and acquiring permits for NPDES wastewater discharges, air quality, Parts A and B of the Resource Conservation and Recovery Act (RCRA); and preparing closure plans and hazardous waste manifests. At the U.S. EPA, he prepared industrial wastewater discharge permits and wrote Environmental Impact Studies for a polyethylene manufacturing plant and an oil refinery.

Mr. Kuljian's fields of competence include: remedial design, construction, and facility operation of contaminated waste sites; industrial water and wastewater treatment; industrial hazardous and solid waste management; remedial alternative treatment evaluations and bench/pilot/prototype confirmation testing; UST management and system upgrade; emergency response planning, regulatory compliance and permit negotiations.

Education

B.S., Environmental Systems, Southern Methodist University, 1974

M.S., Sanitary Engineering, University of Michigan, 1977

Registration/Certifications

Professional Engineer, Michigan, 1981- No. [redacted]

Years of Experience

34

EXPERIENCE

Wastewater Pre-Treatment Facility Design-Build, Quincy Street Meats, Holland, Michigan. Project Manager and Lead Environmental Engineer for the permitting, grant, design, construction and start-up (turnkey) of a 2 phase wastewater pre-treatment system for a ham and sausage production facility to remove BOD, COD, TSS, Oil and Grease, phosphorous and to control pH and odors. Phase 1 (2009) included sewers, pH adjustment, pump station, equalization storage and odor control. Phase 2 (2010-2012) included a 165 gpm rated treatment system with a grease separator, dissolved air floatation, pH monitoring and control, sludge thickening and dewatering and chemical feed systems. System was housed in a 2,200 – square foot building automated with a PLC-based control system. Removals from 75 to 90 percent of all constituents were attained and all below the surchargeable limits by the POTW. Grease removals of 98 to 99 percent and under 1 percent moisture for a saleable by-product are achieved.

Immersed Membrane Biological Reactor (MBR) with Ultrafiltration and Reverse Osmosis (RO) Technology Pilot Scale Demonstration, Confidential Coke Oven By-Products Plant. Designed, set-up and managed the pilot testing for wastewater

Arthur Kuljian, Jr., PE, BCEE (continued)

treatment and effluent reuse for a major international coking coal by-products plant for removal of tar oils, medium strength organics, ammonia nitrogen, BOD, COD, TSS, phenols, heavy metals, polyaromatic hydrocarbons (PAHs) and TDS. Treatment included screening, oil and grease removal, nutrient feed, immersed MBR system, sludge wasting, and Reverse Osmosis. Removals from 85 to 99 percent of all constituents following the MBR and from 95 to 99 percent following RO treatment for potential ultimate reuse in the coke oven plant's cooling water and boiler feed water operations. Optimal flux rates, membrane permeability, transmembrane pressures and membrane maintenance and recovery cleaning frequencies for full-scale design were determined.

Immersed Membrane Biological Reactor (MBR) Wastewater Treatment Pilot Scale Treatability and Design, Delta Airlines Technical Operations Center, Hartsfield International Airport, Atlanta, Georgia. Set up and managed the pilot testing for wastewater treatment and effluent re-use for a major airline's maintenance and repair facility to remove oil and grease, BOD, COD, suspended solids, heavy metals, and volatile organic compounds. Treatment included equalization storage, grit removal, nutrient feed, an immersed MBR system, disinfection, and Reverse Osmosis (RO). Removals from 85 to 99 percent of all constituents were attained following the MBR and from 95 to 99 percent following RO treatment for ultimate reuse in the aircraft and engine cleaning operations.

Wastewater pH Adjustment System Project, Dr. Pepper / 7Up Bottling Group, Holland, Michigan. Project Manager. Provided engineering, procurement, contracting, and commissioning for each Holland facility (North and South). Implemented system allowed client to achieve consistent compliance with the discharge limits as identified in their Industrial User Permit for both the ProPak and CSD plants. Also performed flow monitoring verification and wastewater characterization. Designed hydraulic means to flow through a "gravity" vs. "pumped" conveyance system, resulting in over $100,000 cost savings and maintenance. Met city requirements for full compliance with no pH exceedances during a 24-hour / seven days per week operation.

Sequencing Batch Reactor (SBR) IWTP Optimization Study, Chrysler, Trenton, Michigan. Performed an on-site evaluation and recommendations for enhanced hydraulics and BOD and ammonia removals for a 0.25 mgd oily wastewater automotive engine production facility. SBR operation was assessed and optimized for nitrification and de-nitrification, biological phosphorous removal, F/M, MLSS, sludge settleability and cycle times. Reduced cycle times by 50 percent overall were achieved on static/mixed anoxic, aerated fill, reaction, anoxic reaction, settling, decanting and wasting resulting in BOD, COD and ammonia reduction; TSS reduction in the sand filters and increased flow through the IWTP.

Immersed Membrane Biological Reactor (MBR) Wastewater Treatment Plant Design-Build, Ashland, Kentucky. Managed pilot testing, full-scale design, construction, and start-up for a 0.1-MGD plant for a major oil refinery to remove oil and grease, BOD, COD, suspended solids, heavy metal, and volatile organic compounds. Treatment included equalization storage, oil water coalescing, an immersed MBR system, arsenic removal, sludge dewatering, and chemical feed for nutrient augmentation. Removals from 85 to 99 percent of all constituents were attained and well within local, state, and federal standards.

Tubular Membrane Biological Reactor (MBR) Wastewater Treatment Plant (WWTP) Design-Build, Douglas, Georgia. Managed full-scale design, construction, and start-up for a 30,000-gpd plant for a carburetor manufacturer to remove oil and grease, BOD, COD, suspended solids, heavy metals, and volatile organic compounds. Treatment included equalization storage, oil water coalescing, a tubular MBR system, and sludge dewatering. Removals from 85 to 99 percent of all constituents were attained and well within state and federal categorical metal finishing standards.

Peter Daukss, PE

Technical Advisor

As the Discipline Leader for wastewater engineering, Mr. Daukss has responsibility for technical delivery, quality, and standards for wastewater treatment and biosolids management projects. He has extensive experience in all aspects of wastewater treatment technology and biosolids management.

Design and construction projects include oxidation ditches, sequencing batch reactors, activated sludge, fine pore aeration systems, biological nutrient removal, disinfection and biosolids thickening, dewatering, storage, advanced stabilization, and incineration.

Mr. Daukss has been involved with biosolids technologies related to municipal wastewater treatment facilities for over 30 years. During this period, he has participated in the evolution from the most basic disposal strategies to bioenergy production and resource recovery for sustainable management. Prominent biosolids technologies that he has evaluated include advanced digestion, composting, pasteurization, thermal processing, and pelletization.

Industrial waste treatment projects include biological treatment, physical-chemical treatment, land application, and residuals management technologies.

Education

M.S., Chemical Engineering, University of Toledo, 1980

M.S., Water Resources Engineering, University of Michigan, 1977

B.S., Chemical Engineering, University of Michigan, 1976

Registration/Certifications

Professional Engineer, Michigan, [redacted], 1980

Professional Engineer, Florida, [redacted] 2008

Years of Experience

35

EXPERIENCE

Ultraviolet (UV) Disinfection and Odor Control Improvements, Grand Haven Spring Lake Sewer Authority Wastewater Treatment Plant, Grand Haven, Michigan. Project Manager and Technical Process Leader for evaluation, design, and construction phase for disinfection and odor control improvements. UV disinfection was selected as a replacement for the chlorination-dechlorination system at the plant. Performed an analysis of the potential UV disinfection technology alternatives to replace the chlorine-based system. Also performed an evaluation of odor control alternatives to develop a recommended plan to reduce the potential impacts on the neighboring community. Odor treatment involved the conversion of a thickener tank to a biofilter system.

Wastewater Treatment Plant Bar Screen Improvements, City of Saginaw, Michigan. Technical Project Leader for evaluation, design, and construction phase for modification the existing wet well screens to provide an automatic bar screen cleaning system. Completed an evaluation of options to determine the best solution for this critical wastewater treatment process. Design team met the challenge by developing a plan to integrate the new mechanical screens with the existing structures while maintaining the functional integrity of the original plant processes. A vertical arrangement utilizing a new mechanical gripper cleaning system was determined to be the most practical approach to fit the limited plan area to access the influent bar screens that were 50 feet below ground surface elevation.

Peter Daukss, PE (continued)

North Secondary Treatment System Improvements, City of Grand Rapids, Michigan. Project Manager and Technical Process Leader for evaluation, design, and construction phase for modification of existing north wastewater treatment plant aeration and final clarification systems for 52 MGD sustained flow design. Aeration improvements included modification of the fine pore air diffusion system to taper the air distribution for improved process efficiency. Final clarifiers were upgraded to improve hydraulic efficiency and performance with enhanced energy inlet dissipation and density current baffle design. Modifications of the activated sludge system included provisions for biological selector for enhanced biological phosphorus removal.

Secondary Treatment Improvements for Water Reclamation Plant, City of Kalamazoo, Michigan. Technical Leader for evaluation, design, and construction phase for improvements to the secondary treatment system for 53.3 MGD average design flow capacity. improvements incluided two new single-stage aeration blowers for integration with the new fine pore aeration system. New blowers, coupled with high-efficiency fine pore air diffusion and a control system to monitor oxygen requirements, resulted in substantial energy saving over the previous system. Modifications of the activated sludge system included provisions for biological selector for enhanced biological phosphorus removal.

Secondary Clarifier Improvements, Downriver Wastewater Treatment Plant, Wayne County, Wyandotte, Michigan. Technical Process Leader for evaluation, design, and construction phase for improvements of final clarification systems for the plant with a rated secondary treatment capacity of 125 MGD. Recommended secondary clarifier improvements were developed based on an evaluation of alternatives for modification of the perimeter feed units. Hydraulic testing was performed in conjunction with CFD modeling to identify the optimum inlet distribution and flow dynamics to obtain optimum performance for the clarifiers for the design conditions.

Market Avenue Pump Station Improvements, Grand Rapids Wastewater Treatment Plant, Grand Rapids, Michigan. Project Manager during evaluation, design, and construction of improvements to 90-MGD raw sewage pump station. Evaluated different pump types and capacity based on hydraulic modeling and limitation of existing wetwell and piping configuration. Design required limiting downtime of pump station as much as possible and providing owner with flexibility to use two existing force mains to the plant. Construction phase responsibilities involved daily tracking of work, pay application review, communication between owner and contractor, factory pump test witnessing, and equipment startup.

20-Year Needs Assessment, Bay County Wastewater Treatment Plant, Bay County, Michigan. Technical Process Leader for evaluation of alternatives for wastewater treatment for the Needs Assessment for the 10.3-MGD average annual flow capacity facility. A sustainable design approach was a key component in the Capital Investment Plan for the plant. Planning for energy efficient design coupled with the implementation of renewable energy sources offered the best opportunity for sustainable design. Both economic and environmental advantages of potential sustainable design initiatives were considered. Use of more energy efficient technologies, such as fine pore aeration, was recommended for potential reduction of aeration energy costs by 30 to 40 percent.

South Secondary Treatment System Improvements, City of Grand Rapids, Michigan. Project Manager and Technical Process Leader for evaluation, design, and construction phase for modification of existing south plant aeration and final clarification systems for maximum daily design flow of 52 MGD. Aeration improvements included fine pore air diffusion equipment and high-efficiency aeration blowers. Final clarifiers were upgraded to improve hydraulic efficiency and performance with enhanced energy inlet dissipation and density current baffle design. Modifications of the activated sludge system included provisions for biological selector for enhanced biological phosphorus removal.

Attachment 2
Designated Contact & Certification and Signature Form

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Stephanie Warino

(Name, Title)

Stephanie Warino, PG; WV Operations Manager

(Printed Name and Title)

Tetra Tech, Inc., 1000 Green River Drive | Fairmont, WV 26554

(Address)

Phone: 304.534.4021 | Fax: 304.534.4024

(Phone Number) / (Fax Number)

stephanie.warino@tetratech.com

(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Tetra Tech, Inc.

(Company)

Mark P. Speranza

(Authorized Signature) (Representative Name, Title)

Mark P. Speranza, PE; Vice President

(Printed Name and Title of Authorized Representative)

June 15, 2016

(Date)

Phone: 412.921.7090 | Fax: 412.921.4040

(Phone Number) (Fax Number)

Attachment 3
Addendum Acknowledgement Form

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.:

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

☒ Addendum No. 1	☐ Addendum No. 6
☐ Addendum No. 2	☐ Addendum No. 7
☐ Addendum No. 3	☐ Addendum No. 8
☐ Addendum No. 4	☐ Addendum No. 9
☐ Addendum No. 5	☐ Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Tetra Tech, Inc.

Company

Mark P. Speranza

Authorized Signature

June 15, 2016

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

Attachment 4
Purchasing Affidavit

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Tetra Tech, Inc.

Authorized Signature: M P. Speran Date: June 15, 2016

Commonwealth
~~State~~ of Pennsylvania

County of Allegheny, to-wit:

Taken, subscribed, and sworn to before me this 15 day of June, 2016.

My Commission expires August 8, 2017.

AFFIX SEAL HERE

NOTARY PUBLIC Cynthia K. Haluszczak

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Cynthia K. Haluszczak, Notary Public
Green Tree Boro, Allegheny County
My Commission Expires Aug. 8, 2017
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES