

## ELECTRICAL, CONTROL SYSTEMS, AND SECURITY



# INTEGRATED APPROACH TO PROJECT DESIGN AND DELIVERY

For more than 40 years, Tetra Tech has provided electrical engineering, system integrations, and security system integration services to more than 400 industrial, municipal, and governmental clients nationwide.

Our expert staff of electrical, SCADA, and control systems engineers offers a wide variety of services for new, renovated, and retrofitted projects.

Professional and technical staff members work as a fully integrated unit, with offices regularly sharing resources to keep projects on schedule and under budget. This approach allows us to accommodate changing economic climates as projects flow through the design and construction/implementation phases.

We work on both design-bid-build and design-build projects across North America. We are able to successfully complete projects of all sizes, delivery methods, and schedules.



## ELECTRICAL ENGINEERING AND INSTRUMENTATION

Our electrical engineers are instrumental in developing reports and studies for electrical systems, plans and specifications, construction inspection, equipment testing, start-up services, and personnel training.

We provide efficient, cost-effective electrical systems for our clients through the proper application of current technology. Electrical systems designed by Tetra Tech remain flexible and maintainable. We use the latest technology in computer networking to directly control processes, provide data management reports, and organize maintenance functions.

Each project is carefully monitored, from original concept to design, to ensure established goals are met. Finally, equipment is inspected at the factory and on location to verify conformance with our design standards.

Services include:

- In-plant transmission and distribution design
- In-plant sub-station design
- Standby/emergency power system design
- Energy recovery system design
- Energy conservation studies
- Indoor and outdoor lighting system design
- Special systems for communication, fire and smoke detection, and computer network design
- Short circuit/fault current/load flow studies
- Arc flash studies

*As a member of the U.S. Green Building Council, Tetra Tech's electrical engineering LEED Accredited Professionals work closely with the design team throughout the planning, design, construction, and commissioning system to minimize the project's impact on the environment. We work to extract the maximum LEED points that our client wants to obtain for a project.*

## SYSTEM INTEGRATION

Tetra Tech's approach to addressing SCADA systems is to listen, plan, design, program, and implement. We start by establishing our clients' specific SCADA and information needs. We determine the hardware technology appropriate for reaching client goals, and produce a SCADA system plan that provides a reliable, non-proprietary, robust, and scalable solution for years to come.

Tetra Tech's system integration services involve developing control system platform software and operator interface software. Our detailed plant knowledge and expert programming abilities enable us to optimize plant processes and to graphically depict plant conditions, increasing operator efficiency.

To address the need for "out-of-the-box" software applications, Tetra Tech provides custom code using:

- Visual Basic .Net
- C++ & .NET
- JAVA
- SQL
- ORACLE

Our thorough development process gives the client a chance to provide feedback before major software programming has begun, thus reducing programming change costs, ensuring best custom solutions, and promoting operator acceptance early into the project.

After design and programming, Tetra Tech can:

- Establish effective operating strategies
- Provide full-service programming support of the control system platform, visualization programming (HMI), Information Data Management (web-based O&M, database historization, and reporting services), interoperable, and "open" systems that can be easily expanded and upgraded
- Provide process automation for water, wastewater, industrial, and manufacturing processes

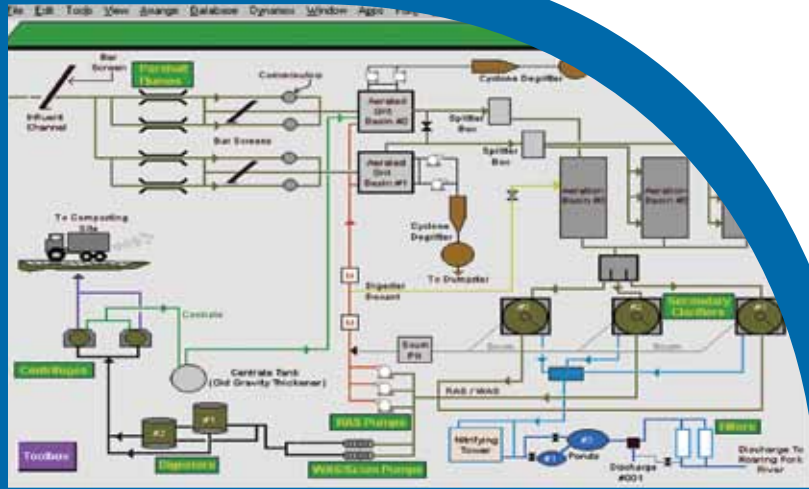


## CONSTRUCTION AND SERVICES

Tetra Tech provides full construction administration services. At the beginning of the construction phase, we offer bid evaluation services to assist the client in selecting the most responsible bidder.

During the construction phase, we review shop drawings and field work to verify conformance with the project requirements and construction documents. We also provide construction administration services such as evaluating pay requests, reviewing contractor progress, developing record drawings, preparing O & M manuals, and training facility staff.

We stay with the project through full owner acceptance.



## SECURITY

Both cyber and physical security are key applications for any SCADA project. We work closely with our clients to implement the most appropriate level of security.

For cyber security, Tetra Tech provides:

- Hardware and software solutions
- Systems that connect media with client enterprise networks
- Shared network communications
- Applications to monitor, track, record, and alert appropriate personnel, including change management software and detection software such as TripWire.

Physical security for municipal facilities—such as water, wastewater, and transit facilities, as well as chemical, petrochemical, and manufacturing plants—is a national concern. Current local legislation and future national legislation will require additional security and vulnerability assessments. Tetra Tech has the expertise to support these assessments using multiple approaches, including our ALPHATM model software.

In addition to assessments, Tetra Tech can implement the recommended security measures, including video surveillance, intrusion detection, access control, and automated force protection measures. These can be designed and implemented as stand-alone systems or integrated into an overall facility SCADA system.

## COMMUNICATION

Integrating electrical, control, security, and communication systems requires a reliable, robust, and secure communication network.

Tetra Tech has provided communication design and implementation services for copper, fiber, and wireless media-based systems. Our expertise is in multiple media solutions, using the most appropriate media for each individual location.

These systems often use many types of communication protocols.

Tetra Tech can apply:

- TCP/IP
- DH, DH+, DH 485
- ControlNet, DeviceNet
- ProfiBus, ProfiNET
- Foundation Fieldbus
- Modbus, Modbus Plus
- H1
- RS232/RS422/RS485

## CORPORATE HEADQUARTERS

3475 East Foothill Boulevard, 3<sup>rd</sup> Floor  
Pasadena, CA 91107  
Phone: +1 (626) 351-4664  
Fax: +1 (626) 351-5291  
[www.tetratech.com](http://www.tetratech.com)

## COMPANY FACTS

- Annual revenue: \$2.2 billion (FY20010)
- NASDAQ Symbol: TTEK
- Approximately 12,000 employees
- Geographic reach: 330 offices worldwide

# INTEGRATED SOLUTIONS

## ELECTRICAL ENGINEERING AND INSTRUMENTATION

Tetra Tech applies cutting-edge technology to develop efficient, cost-effective systems that remain flexible and easy to maintain.

- LEED-accredited substation design
- Standby power and emergency recovery
- Transmission and distribution
- Load-flow monitoring
- Arc flash studies

## SECURITY

Tetra Tech offers state-of-the-art security measures to protect assets and infrastructure from cyber and physical threats.

- Access control and notification
- Video surveillance
- Fire and smoke detection
- Paging and intercom communication
- Network and stand-alone systems

## SCADA PROGRAMMING AND CONTROLS

Tetra Tech's programming experts integrate system and operator interface software and controls to optimize plant processes.

- Customized software
- Open, expandable systems
- Operator-driven, field-tested solutions
- Terminal and web-based operation and maintenance

## CONSTRUCTION MANAGEMENT

Tetra Tech's comprehensive construction administration services ensure conformance with project requirements and trouble-free implementation.

- Bidding and bid evaluation
- Field progress review and verification
- System testing and acceptance
- O&M documentation and training
- Remote or on-site support

## SYSTEM INTEGRATION

Tetra Tech helps clients maximize utilization of their assets through linked systems such as GIS and LIMS.

