

**CITY OF CARLSBAD
CLASS SPECIFICATION**

**JOB TITLE: SCADA & INSTRUMENTATION TECHNICIAN
SENIOR SCADA & INSTRUMENTATION TECHNICIAN**

DEPARTMENT: UTILITIES

BASIC FUNCTION:

Under general supervision incumbents will develop, integrate, install, operate, and maintain the city's supervisory control and data acquisition (SCADA) system. This includes Operational Technology (OT) hardware and software, human machine interfaces (HMIs), programmable logic controllers (PLCs), remote telemetry units (RTUs), radio communication systems, computer systems, and other electrical instrumentation. May also perform system analysis, development, and cybersecurity tasks, and assist in the continuous improvement of SCADA system and OT technologies. Collaborates with the city's IT Department for SCADA-related servers, networking, cybersecurity, and communications. Plans, coordinates, and performs technical duties in compliance with the city's administrative orders and technology policies and standards. Ensures that the SCADA system is available 24/7. Performs related duties as assigned.

DISTINGUISHING CHARACTERISTICS:

The SCADA & INSTRUMENTATION TECHNICIAN is the journey-level class in the SCADA & INSTRUMENTATION TECHNICIAN series. Incumbents provide input on design and perform maintenance, programming, and repair of the city's electrical instrumentation and SCADA systems. Assignments are either general or can be project focused, requiring the incumbent to exercise independent judgment and initiative while coordinating the tasks with other work units. This position reports directly to the SCADA Supervisor and may also receive work direction from the SENIOR SCADA & INSTRUMENTATION TECHNICIAN.

The SENIOR SCADA & INSTRUMENTATION TECHNICIAN is designated as a lead level professional and is experienced in SCADA and electrical work. Incumbents will work under limited supervision on more complex projects to maintain, enhance, or support the city's electrical instrumentation and SCADA systems. Incumbents must possess a strong electrical and instrumentation understanding, have a diverse electrical and SCADA maintenance background, and a thorough comprehension of control systems. The SENIOR SCADA & INSTRUMENTATION TECHNICIAN may provide work direction to the SCADA & INSTRUMENTATION TECHNICIAN. This position reports directly to the SCADA Supervisor.

KEY RESPONSIBILITIES:

(These are representative duties and the emphasis on certain duties will vary depending on the job assignment.)

SCADA & Instrumentation Technician

Read and interpret electrical drawings, schematics, power distribution drawings, control panel wiring diagrams, and installation manuals for electrical and instrumentation systems. Provide mark up of working drawings.

Maintain, diagnose defects in and repair variable frequency drives, motor controls, and automated process control equipment.

Calibrate, diagnose defects in and repair electronic sensors, monitoring equipment and data acquisition systems.

Perform electrical inspections, start-up, and testing.

Perform modifications and test factory-provided software, hardware, and configurations for conformity with requirements, specifications.

Program, install, repair, and maintain distribution and plant automation systems, including programmable logic controllers (PLCs) and human-machine interface (HMI) software.

Use network commands and software analysis tools to troubleshoot and diagnose issues, coordinate and participate in maintaining and enhancing process automation and network functionality.

Perform preventive, corrective, predictive, and demand maintenance on all electrical and instrumentation systems.

Provide ongoing support for SCADA operations and system upgrades.

Collaborate and communicate effectively as required with staff and contractors involved in the design, support, maintenance and use of the SCADA system and related data.

Perform related duties as assigned.

Senior SCADA & Instrumentation Technician

Performs the duties of the SCADA & Instrumentation Technician in addition to:

Programs, installs, and maintains the reliability of the plant automation network on multiple platforms for the city's programmable logic controllers (PLC), human-machine interface (HMI) and related process automation and control systems; supports network communications and associated hardware including process input/output (I/O), local area and wide area networks (LAN/WAN) and the radio/microwave network.

Analyzes process requirements and end-user needs, identifies, and analyzes complex systems development, modification, and enhancement issues, develops, and refines system specifications, evaluates, modifies, and tests factory-provided software, hardware, and configurations for conformity with requirements, specifications, standards for compatibility and integration with current system, makes recommendations for the resolution of problems identified.

Programs new and enhanced automation controls, performs software and firmware upgrades, configures, and enhances the performance of operating systems, adds additional sites and equipment to system, performs testing and system startups.

Monitors system security and the performance of security protocols; identifies unauthorized access and potential security breaches; reports findings promptly to management and provides recommendations for security and SCADA system performance improvements.

Monitors working condition of electrical and electronic equipment within city water/wastewater system. Provides primary support for diagnosing defects in, maintaining, and repairing all electronic equipment used in the operation of the water/wastewater system.

Plans and lays out jobs from drawings, sketches, or verbal instructions, maintains records in the form of plans and specifications, develops and maintains accurate and up-to-date documentation, monitoring reports, logs, and files.

Order and track equipment, parts, materials, and supplies as directed by the SCADA Supervisor.

Provide coordination and oversight of contractors when used for any SCADA and electrical system needs.

Perform related duties as assigned.

REPORTING RELATIONSHIPS:

The SCADA & Instrumentation Technician/Senior SCADA & Instrumentation Technician reports to the SCADA Supervisor.

QUALIFICATIONS:

SCASCADA & Instrumentation Technician

Knowledge of:

- Low and medium voltage motor controls, low and medium voltage power distribution, instrumentation and control systems, radio communications systems, SCADA systems, and programmable logic controller system design and programming.
- Principles, practices, techniques, theory, and operation of electronic and electrical equipment including low voltage industrial electrical systems, components, and motors.
- Communications systems as used in the remote process control field including hardwire modems, wireless modems, cellular communications, and radio.
- Principles, methods, and techniques in the design and operation of automated process control systems and their components.
- Relevant programming languages, including those applicable to specialized field hardware and devices such as PLC ladder logic and programming languages.
- Safety policies and safe work practices applicable to the work.
- Records management, recordkeeping, filing and basic purchasing practices and procedures.
- National Electrical Code and Safety Orders of the California Department of Industrial Relations.
- Applicable laws, codes, regulations, policies, and procedures.

SENIOR SCADA & INSTRUMENTATION TECHNICIAN

Knowledge required of the SCADA & Instrumentation Technician in addition to:

- Programming and operating system capabilities and constraints applicable to the city's process control environment. Excellent understanding of computer operations, Windows, and Microsoft Office.
- Programming Rockwell Automation ControlLogix PLC's and Ignition HMI software.
- Basic knowledge and understanding Java, Python and/or Jython programming languages is desirable.
- Basic knowledge and understanding of HTML, CSS, and JavaScript is desirable.
- Basic knowledge and understanding version control systems such as Git is desirable.
- Basic knowledge and understanding of Relational databases is desirable.
- Basic knowledge and understanding APIs JSON, SOAP, REST, GSON is desirable.

Ability to:

SCADA & INSTRUMENTATION TECHNICIAN

- Install, maintain, and repair equipment related to electronics, instrumentation control, telemetry, and telecommunications.
- Read, interpret, and understand plans, schematics, technical manuals, diagrams, blueprints, and drawings.
- Effectively diagnose problems and perform necessary repairs including the replacement of defective parts, electrical wiring and panel modifications, and troubleshooting.
- Write concise operating instructions detailing, control parameters and their effects under normal and failure conditions.
- Calibrate and test a variety of instrumentation systems designed for monitoring and control.
- Uses math and mathematical reasoning.
- Work independently and efficiently to carry out assignments.
- Communicate effectively both orally and in writing.
- Interpret, apply, and explain rules, regulations, policies, and procedures.
- Establish and maintain cooperative and effective working relationships.
- Analyze situations accurately and adopt an effective course of action.
- Operate a computer and other office equipment.
- Work safely and maintain a safe work environment.
- Maintain detailed records and prepare clear and concise reports.
- Reach sound decisions in accordance with city policies and procedures.
- Communicate using Interpersonal skills, tact, patience, and courtesy.

SENIOR SCADA & INSTRUMENTATION TECHNICIAN

Abilities required of the SCADA & Instrumentation Technician in addition to:

- Assist in managing a wide variety of wireless network infrastructure and Radios. Cisco, Ubiquity, GE MDS, etc.
- Ensure wireless telecommunications network complies with industry and FCC standards and regulations.
- Apply understanding of theories and concepts of process automation & control, water treatment processes, and distribution systems.

- Troubleshoot, diagnose, and resolve complex systems problems.
- Perform technical functions requiring extensive understanding of automated control systems, network communication system and their software and hardware components.
- Configure, maintain, and manage the operations of computer platforms and/or networks to achieve optimal process performance and user support.
- Demonstrate initiative and accuracy.
- Learns and apply new information and skills.
- Performs highly detailed work, deals with changing deadlines, constant interruptions, and multiple concurrent tasks, and interacts with others encountered in the course of work.

EXPERIENCE AND EDUCATION:

Any combination equivalent to experience and education that could likely provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the knowledge, skills and abilities outlined above is:

SCADA & INSTRUMENTATION TECHNICIAN: Minimum three years of experience in the maintenance, repair and installation of SCADA, instrumentation, telemetry, electrical, computer and communications systems. College level course work in electronics or a related field is desired.

SENIOR SCADA & INSTRUMENTATION TECHNICIAN: Graduation from an accredited college or university with major coursework in electronics, computer information systems, engineering, or a closely related field, and at least five years of progressively responsible experience in the implementation and maintenance of process automation and controls or an equivalent combination of training and experience. Additional experience and demonstrated competence and expertise may be substituted for a college degree. Experience in a public agency is preferred.

SPECIAL REQUIREMENTS:

Valid California Driver’s License

SCADA & INSTRUMENTATION TECHNICIAN

CWEA Electrical/Instrumentation Grade II

SENIOR SCADA & INSTRUMENTATION TECHNICIAN

ISA Certified Control Systems Technician — Level 1, or CWEA Electrical/Instrumentation Grade III

PHYSICAL STANDARDS:

Must possess sufficient strength and stamina to lift, carry and manipulate objects weighing up to 50 lbs. maintain physical condition necessary for standing walking, sitting, kneeling or bending for prolonged periods of time. Must be willing to work outdoors, in all weather conditions; to work in confined places with exposure to potentially hazardous conditions, and to work at heights.

Must be available to work overtime and respond to emergency calls; work varying hours, including weekends, holidays, days off.

Specific vision abilities required for this job include close vision, distance vision, use of both eyes, depth perception, color vision and the ability to adjust focus.

ENVIRONMENTAL CONDITIONS:

Office and field environment; travel from site to site; exposure to noise, dust, grease, smoke, fumes, gases, electrical energy, toxic materials, and inclement weather conditions, loud or prolonged noise and equipment with heavy vibrations; work around or with potable water, recycled water and wastewater; work on ladders/scaffolding or in high, precarious places; work on uneven or slippery surface; work near moving mechanical parts and equipment.

DATE APPROVED: January 24, 2023