

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT CLASSIFICATION SPECIFICATION

TITLE: SENIOR CONTROL SYSTEMS AND COMMUNICATION TECHNICIAN

DATE: 7/1/2020

JOB CODE: 21851

FLSA STATUS: NON-EXEMPT

UNIT REPRESENTATION: GEN

Class specifications are intended to present a descriptive list of the range of duties performed by employees in the class. Specifications are not intended to reflect all duties performed within the job.

DUTIES SUMMARY

Under general supervision or direction, to perform a wide variety of journey level professional and technical duties in the planning, design, implementation, calibration, testing, and modification of supervisory control systems, Radio Frequency (RF) and fiber-optic based telecommunication systems, water reclamation plant process control systems, water treatment plant process control systems, Department's Distribution System Hydraulic Model (DSHM), security and access control systems, and field telemetry communication systems; train, instruct, and participate in the work of an assigned crew; work under the appropriate applicable provisions of the National Electrical Code, California Electrical Code, approved plans, specifications, and standard industry practices; and perform other related work as required.

DISTINGUISHING CHARACTERISTICS

The Senior Control Systems and Communication Technician is the journey level working crew member in the Control Systems and Communication Technician series. In addition to fully performing the duties of the entry level class, incumbents in this class perform a variety of more difficult and complex professional and technical tasks involved in the maintenance, development, implementation, and support of the Department's process control systems, supervisory control systems, and wide area telecommunication networks including radio-based telemetry and voice radio systems, instrumentation, and electrical systems. Incumbents may be responsible for training, and/or instructing the work of assigned crew members and may also oversee the inspection of work performed by contractors. Incumbents are expected to work under general direction using good judgment and discretion in carrying out work assignments and directing the work of others and may serve in the absence of the Lead Control Systems and Communication Technician and the Control Systems and Communications Supervisor. Supervision is received from the Control Systems and Communication Supervisor.

EXAMPLES OF DUTIES

The following duties are typical essential duties for positions in this classification. Any single position may not perform all of these duties and/or may perform similar related duties not listed here:

- Provide courteous and expeditious customer service to the general public and City and Department staff;
- Routinely adhere to and maintain a positive attitude toward City and Department goals;

- Design, develop, implement, modify, install, and maintain hardware, software, electrical and electronic apparatuses, and communication components of the Department's computer-based supervisory control systems, DSHM, human machine interfaces (HMIs), security systems, and communications network backbone and associated horizontal cabling;
- Provide technical guidance and participate in the development, implementation, modification, installation and maintenance of the Department's radio communications, voice radio systems, fiber-optic communications, access control, process control, supervisory control, and telemetry systems;
- Create detailed applications, scripts, and other programming functions for various supervisory control systems, automation, and Oracle database projects; work with software vendors to develop unique and specific applications to support the complex needs of the Water Utility and Water Reclamation divisions;
- Administer and create complex programs utilizing standard protocols and computer programming languages for integrating supervisory control systems with connected computer systems and other microprocessor-controlled devices (external and internal to the supervisory control system network);
- Assist with establishing application programming standards and naming conventions;
- Perform programming using a variety of programming software and programming tools;
- Design, create, evaluate, install, implement, test, modify, and troubleshoot control programs and operator interface graphics for new automation enhancements to existing PLCs, computers, configurations, and applications to facilitate operational requirements of the Water Utility and Water Reclamation divisions;
- Design, implement, and test system disaster recovery strategies and procedures intended to assure "mission critical" system components of supervisory control systems always remain operational;
- Monitor and document the startup of control systems and debugging procedures; make necessary adjustments to assure proper operation of control systems;
- Assist with the development of documentation and online help systems for supervisory control, access control and telemetry-based system operations;
- Document and record all programming, testing, and updates performed;
- Assist with the maintenance of ladder logic, databases, network diagrams, and operator interface graphics master files; assist with the maintenance of the Department's Distribution System Hydraulic Model and database;
- Diagnose control system and network hardware malfunctions; perform maintenance and repair; replace components and parts and change out equipment when necessary to ensure timely and accurate completion of preventative maintenance activities;
- Follow data backup & archiving procedures for real-time supervisory control system generated data;
- Automate the collection of information and the generation of reports produced by the supervisory control system;
- Participate in calibrating, troubleshooting, and repairing instrumentation systems, control and process loops, PID controllers, and associated equipment;
- Ensure work quality and adherence to professional codes, standards, and Department specifications;
- May schedule and coordinate activities with other organizational units, suppliers, consultants, contractors, and/or other agencies;
- Effectively utilize test equipment;
- Perform a variety of difficult and complex tasks in the diagnoses, calibration, installation, and troubleshooting of radio and fiber-optic communication system equipment, security equipment, telemetry-based controllers, programmable logic controllers, remote terminal units, primary sensors, and related systems;

- Investigate the operation of existing control and telecommunications systems to determine the cause of failures; recommend engineering and design changes necessary to prevent the recurrence of such failures;
- May coordinate and ensure the quality of control and telecommunication systems provided by contracted equipment suppliers and consultants;
- Perform journey level installation, maintenance, and repair of control circuits, pressure switches, float switches, underground cables, motors, telemetry, copper lines and power output frequency regulators, and transducer recorders;
- Inspect tele-metering, electronic controllers, programmable controllers, process meters, analyzers, flow meters, and a variety of other types of instrumentation for proper operation;
- Participate in performing installations, repairs, modifications, calibrations, and preventative maintenance on a wide variety of digital, analog, programmable, and other auxiliary equipment used in the collection, transmission, and treatment of water and wastewater systems;
- Install, troubleshoot, and maintain fiber-optic systems; conduct regular inspections of fiber optic systems and locate and repair defects;
- Assess, maintain, and repair closed network backbone and horizontal cabling for security systems and supervisory control systems;
- Design, implement, update, and maintain security solutions for access control systems, closed-circuit television (CCTV) systems, and perimeter intrusion detection systems (PIDS);
- Install, configure, maintain, and manage servers, remote client workstations, hardware, and software associated with Department's CCTV systems, PIDS systems, access control systems;
- Plan and coordinate tasks from specifications, blueprints, wiring diagrams, drawings, sketches, or verbal instructions; maintain as-built records in the form of blueprints, plans, and specifications;
- Pull, install, splice, and terminate wiring; work on equipment and cables underground or from ladder, tower, bucket truck, or aerial lift;
- Operate, clean, and maintain hand tools, pipe threaders, hydraulic pipe benders, portable power tools, electrical testing equipment, instrumentation testing and calibration equipment, computers, and other tools commonly used in water and wastewater utility work;
- Inspect equipment installation work performed by contractors and other personnel for workmanship and compliance with specifications;
- Maintain an inventory of parts, materials, and supplies used in the Control Systems and Communication section and in performing everyday tasks;
- Maintain network communication between equipment, controls, field hardware, and supervisory control system;
- Requisition necessary materials, equipment, and supplies;
- Respond to emergency situations during weekends, holidays, and off hours as required;
- Review and provide input and suggestions on new system requirements;
- Provide training, instruction, inspection, and evaluation to entry level technicians within the Control Systems and Communication Section; may direct the work of assigned workers on a crew;
- Work effectively with others;
- Disconnect electrical sources (up to 600 volts), and follow Department Lockout/tag-out procedures and current OSHA requirements;
- May assist in orienting or training personnel; make recommendations for improvements to job procedures;

- Use Department's computerized maintenance management system (CMMS) software to initiate and respond to work orders and service requests and to monitor and track work progress;
- Perform all work in accordance with established safety policies, procedures, and methods, including OSHA regulations relating to confined space entry and working around dangerous gases; take appropriate precautions to preserve own safety and the safety of others while performing tasks;
- Read, understand, and ensure compliance with Department's Safety Manual; attend safety trainings and/or meetings as required; report all accidents, violations, or infractions as required;
- May be required to wear respiratory protective equipment to include respirators or Self-Contained Breathing Apparatus (SCBA);
- Perform related duties as assigned.

QUALIFICATIONS

Any combination of education, training, and experience that would likely provide the knowledge, skills, and abilities to successfully perform in the position is qualifying. A typical combination includes:

Knowledge of:

- Principles, theory, and practices of electricity, electronics, pneumatics, hydraulics, and mechanics as they apply to maintenance and repair of equipment and instruments commonly found in water distribution, water treatment, and wastewater treatment facilities;
- Principles, practices, and methods of process automation, process control, and computer systems/network maintenance, including configuration, performance tuning, components and devices, operating systems, characteristics, and configuration settings;
- Principles, practices, and methods of access control, intercom systems, closed circuit television monitoring, and perimeter intrusion detection systems;
- Linux, Unix, and Windows operating systems, programming, and application software;
- Standard programming languages and protocols, including but not limited to Java, C, Perl, Visual Basic, Oracle PL/SQL, and Linux shell scripting;
- Network architectures and methods of network design and integration, including topologies and protocols;
- Fiber-optics technology;
- Supervisory control system theory;
- PLC ladder logic programming for program development, modification, testing, commissioning and troubleshooting;
- Repairing PLC components and data highway systems;
- PLC control panel design, wiring, and troubleshooting;
- Human-machine interface (HMI) software packages;
- Data radio systems, wireless network repeaters, Ethernet, and serial wireless data radio/modems;
- Terminology used in networking and desktop computer support;
- Principles, methods, and techniques in the design and operation of supervisory control systems and associated systems equivalent to those used by the Department;
- Applicable codes and regulations;
- Electrical safety practices, precautions, and procedures;
- Tools, materials, methods, and practices of electrical and instrumentation trade;

- Symbols and standard practices used in the preparation of process and instrument flow diagrams;
- Electrical installations and maintenance in water utility or reclamation facilities including low voltage (600V or less) electrical systems;
- Shop mathematics applicable to the electrical and electronics trades;
- Business software including but not limited to Microsoft Office Suite (Word, Excel, Access, PowerPoint, Outlook), Adobe Acrobat, Bluebeam REVU;
- Instrumentation calibration concepts and procedures;
- Appropriate safety precautions and procedures;
- Record keeping, documentation, and practices;
- English usage, spelling, grammar, and punctuation;

Ability to:

- Report for work on time;
- Recommend changes to improve the safety, efficiency, or effectiveness of system operations and equipment;
- Understand and appropriately implement oral and written instructions;
- Communicate effectively, both orally and in writing;
- Prepare reports and keep accurate records;
- Organize with the ability to appropriately prioritize work and exercise independent judgement, wisdom, common sense, and initiative; work independently in the absence of supervision;
- Establish and maintain effective working relationships with City and Department staff, the public and others encountered in the course of work; exercise patience, tact, diplomacy and courtesy while interacting with the public and employees;
- Understand and follow Department policies and procedures;
- Plan, organize, schedule, and monitor work for efficiency, quality, and timeliness;
- Operate personal computers, PLCs, HMIs, communications and network test equipment, and related specialized equipment; estimate necessary equipment to complete assignments;
- Make sound, independent decisions within established guidelines;
- Apply theories and concepts of communication, process automation and control to water utility and water reclamation processes;
- Perform supervisory control system, networking equipment, software, and hardware configurations efficiently and accurately;
- Troubleshoot instrumentation, control system hardware and software problems and recommend and/or perform necessary repairs or modifications;
- Operate power tools, hand tools and light equipment used in the electrical trade; operate specialized test equipment including but not limited to milliamp and millivolt calibrators, multimeters, power supplies, and oscilloscopes;
- Read, understand, interpret, and apply knowledge from technical manuals, drawings, specifications, layouts, diagrams, blueprints, plans, and schematics;
- Perform mathematical calculations involving fractions, decimals, percentages and trigonometry with speed and accuracy;
- Recognize, report, and/or correct unsafe working conditions;

- Respond to call-out or emergencies as required; handle emergency situations as directed;
- Be physically capable of entering permit required confined spaces;
- Lift maintenance hole covers; enter, descend, ascend, and exit maintenance holes;
- Calibrate and operate an atmospheric tester;
- Participate in Department Fit Testing Program;
- Wear protective respiratory equipment to include but not limited to SCBA and personal escape respirator;
- Maintain a driving record which meets Vehicle Code Standards and is acceptable to the Department and its insurance carrier.

MINIMUM QUALIFICATIONS

Education and Experience:

At least one (1) year of experience in the use of proprietary human machine interface (HMI) software packages. Must be proficient in the design and operation of supervisory control systems and associated systems equivalent to those used by the Water Department.

AND

Associate Degree in Computer Science, Electrical Engineering, Electronics, or Instrumentation and Control Systems, or closely related science **and** two (2) years of experience in supervisory control systems design, installation, maintenance, and/or repair (utility/industrial applications preferred) including at least two (2) years of experience in the programming of programmable logic controllers (PLCs).

OR

High School graduation or equivalent **and** four (4) years of experience in supervisory control systems design, installation, maintenance, and/or repair (utility/industrial applications preferred) including at least two (2) years of experience in the programming of programmable logic controllers (PLCs).

OR

Trade/Military Technical School graduation **and** three (3) years of experience in supervisory control systems design, installation, maintenance, and/or repair (utility/industrial applications preferred) including at least two (2) years of experience in the programming of programmable logic controllers (PLCs).

License/Certificate:

Possession of a valid Class "C" California driver's license. For out of state applicants, a valid driver's license is required and a valid Class "C" California driver's license must be obtained within ten (10) days of appointment (CA Vehicle Code 12505c).

Possession of a Grade I Certified Control Systems Technician certificate, issued by the International Society of Automation (ISA) or Grade III Electrical Instrumentation Technologist certificate, issued by California Water Environment Association (CWEA) is highly desirable.

NECESSARY SPECIAL REQUIREMENTS

Must be able to respond to emergency call-out situations as necessary and participate in standby or on-call duty including emergency response during after hours, weekends, and holidays according to predetermined schedules.

Must be clean shaven or have trimmed facial hair in order to properly use personal respirators and SCBA equipment. Must pass a respirator medical exam and be physically able to wear SCBA equipment. Must be able to work in enclosed spaces while wearing protective clothing and under extreme temperatures and hazardous environment.

PHYSICAL TASKS AND ENVIRONMENTAL CONDITIONS

Work is performed in a standard office setting and outdoor field environment. Incumbents work near moving mechanical parts, are exposed to wet and/or humid conditions, exposed to electrical hazards, heavy vibration, hazardous traffic conditions and confined spaces. Incumbents work on slippery or uneven surfaces and work occasionally involves exposure to potential physical harm, infectious disease and hazardous chemicals including smoke, fumes or airborne particles, gas, untreated wastewater, dirt, dust, grease, oil, caustic chemicals, solvents, and toxic agents, and fumes in various states (gaseous, liquid, or solid). Incumbents need to be able to tolerate unpleasant odors, wet conditions and uncomfortable climate conditions. Incumbents are regularly required to sit, walk, and stand on a variety of surfaces, use hands to finger, handle, feel, or operate objects, tools, and controls, use hands and arms at any height (including above the shoulder), perform repetitive movements of hand and/or wrists climb or balance on ladders or stairs, and traverse or stand on uneven surfaces. There is frequent need to stand, stoop, bend at the waist, walk, crawl, crouch, climb and perform other similar actions during the workday. Employee accommodations for physical or mental disabilities will be considered on a case-by-case basis.

Incumbents require sufficient mobility to work in a variety of environmental and weather conditions, transport materials and supplies weighing up to 100 pounds, work in aerial lifts up to 60 feet, work to heights of 150 feet, walk, stand and sit for prolonged periods of time. Must be able to see in the normal visual range with or without correction. Must be able to hear in the normal audio range with or without correction. Employee accommodations for physical or mental disabilities will be considered on a case-by-case basis.

CAREER LADDER

From: Senior Control Systems and Communication Technician

To: Lead Control Systems and Communication Technician
Control Systems and Communication Supervisor
Electrical Services Superintendent

Testing Standards: App Review/Supp App Review

Job Description:

BOWC Approved:

6/23/2020