

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT CLASSIFICATION SPECIFICATION

TITLE: LEAD CONTROL SYSTEMS AND COMMUNICATION TECHNICIAN

DATE: 7/1/2020

JOB CODE: 21853

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, perform a wide variety of advanced 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; lead, guide, train, instruct, correct, document, and participate in the work of an assigned crew; act as a project leader, coordinating, overseeing, inspecting, and monitoring the work of professional and technical staff; 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 Lead Control Systems and Communication Technician is the advanced journey level working crew leader in the Control Systems and Communication Technician series. In addition to fully performing the duties of the senior 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 are responsible for training, instructing, directing, and monitoring 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 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;

- Participate, oversee, lead, direct, train, guide, check, monitor, inspect, assign, and report on (collectively referred to as “lead” the work of assigned section staff engaged in the performance of skilled, semiskilled, and unskilled work in the design, maintenance, repair, construction, installation, and calibration of various control systems, communication systems, access control systems, security systems, and process instrumentation;
- 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 complex and 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 advanced 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;
- Develop documentation and online help systems for supervisory control, access control, and telemetry-based system operations;
- Document and record all programming, testing, and updates performed;
- Maintain ladder logic, databases, network diagrams; and operator interface graphics master files; maintain Department's Distribution System Hydraulic Model and database;
- Manage vendor licensing and support contract issues related to Department's various control systems and their associated computer operating systems;
- 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;
- Assist Management in developing plans for future expansions and enhancements concerning plant automation and data communication, including budgeting for acquisition, installation, maintenance, and updating plans for changing technology;

- Administer 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;
- Lead and 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;
- 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;
- 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;
- Lead and participate in performing installations, repairs, modifications, calibrations, and preventative maintenance on a wide variety of complex 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, and 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;
- Estimate labor and material for supervisory control system, access control system, security system installations, and repairs; lay out work on the project site; prepare reports of time and material expended;
- Maintain an inventory of parts, materials, and supplies used in the Control System and Communications 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 and journey level technicians within the Control Systems and Communication Section; 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;
- May participate in scheduling assigned staff, completion and/or review of work orders, review of time sheets, and other routine administrative activities as directed;
- 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 and 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:

- Basic leadership, including appropriate laws and regulations including, but not limited to, FLSA, EEO, ADA, discrimination, harassment, sexual harassment, and working conditions;
- 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 at an advanced level;
- PLC ladder logic programming theory at an advanced level for program development, modification, testing, commissioning, and troubleshooting;
- Repairing PLC components and data highway systems;
- PLC control panel design, wiring and troubleshooting at an advanced level;
- Human-machine interface (HMI) software packages;
- Data radio systems, wireless network repeaters, Ethernet & serial wireless data radio/modems;

Ability to:

- Report for work on time;
- Oversee, lead, direct, train, guide, check, monitor, inspect, assign, and report on the work performed by subordinate Section Staff;
- 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;
- Effectively convey oral and written directives from superiors to subordinates;
- 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 advanced in-depth understanding of 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 and 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;
- Operate a Department vehicle observing legal and defensive driving practices;
- 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 two (2) years of journey level 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 journey level 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** six (6) years of journey level 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** four (4) years of journey level 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 II 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: Lead Control Systems and Communication Technician

To: Control Systems and Communication Supervisor
Electrical Services Superintendent

Testing Standards: App Review/Supp App Review

Job Description:

BOWC Approved:

6/23/2020