

SAN BERNARDINO MUNICIPAL WATER DEPARTMENT CLASSIFICATION SPECIFICATION

TITLE: SCADA ANALYST

DATE: 5/17/2016

JOB CODE: 21828

FLSA STATUS: NON-EXEMPT

UNIT REPRESENTATION: GENERAL

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 direction, perform highly skilled work in the areas of planning, design, implementation, testing, operation, documentation, security, troubleshooting, hardware and software maintenance, and monitoring of the Department's Supervisory Control and Data Acquisition (SCADA) system(s), the Department's Distribution System Hydraulic Model (DSHM), human machine interfaces (HMI), and the Department's security systems, including remote hardware, software, and communications; work in and around low voltage (600V or less) panels and circuits; work under the appropriate applicable provisions of the National Electric Code, approved plans, specifications, and standard industry practices; maintain the SCADA system's Remote Terminal Units (RTUs), Programmable Logic Controllers (PLCs), and associated control equipment and systems; supports network communications and associated hardware, from process Input/Output (I/O) networks to the Local Area Networks (LANS) and Wide Area Network (WAN) used in the plant information networks; train, instruct, correct, and document the work of assigned contractors and/or crew members in the performance of specific tasks; and perform other related work as required.

DISTINGUISHING CHARACTERISTICS

This class is the advanced journey level working crew leader in the instrumentation/SCADA series. In addition to fully performing the duties of the senior level class, incumbents are responsible for training, instructing, and evaluating the work of assigned crew members. Incumbents in this class may also oversee the inspection of work performed by contractors and will perform more complex troubleshooting and diagnosis of SCADA and electronic problems and develop solutions to complex SCADA and electronic problems. Incumbents are expected to work under general direction using good judgment and discretion in carrying out work assignments and directing the work of others. Incumbents also possess greater skill and expertise in the operation and maintenance of SCADA equipment/systems, instrumentation equipment/systems, and electrical equipment/systems. Supervision is received from the SCADA/Instrumentation 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;
- Design, develop, implement, modify, install, and maintain hardware, software, electrical and electronic apparatuses, and communication components of the Department's computer-based SCADA, DSHM, HMI, security systems, and plant information LAN/WAN networks;
- Create complex and detailed applications, scripts, and other programming functions for various SCADA, automation, and Oracle database projects; work with software vendors to develop unique and specific applications to support complex needs of the water utility and water reclamation divisions;
- Administer and create complex programs for integrating SCADA and other systems with connected computer systems (external and internal to the SCADA network); utilize standard protocols and computer language to create these interfaces;
- Lead and participate in troubleshooting and repairing instrumentation systems, control and process loops, PID, and associated equipment;
- Ensure work quality and adherence to professional codes, standards, and Department specifications;
- Design, develop, and write programs 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 SCADA remain operational at all times;
- Manage vendor licensing and support contract issues related to SCADA and its associated computer operating systems;
- Diagnose control 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 in developing plans for future expansions and enhancements concerning plant automation and data communication, including budgeting for acquisition, installation, maintenance, and adapting plans for changing technology;
- Administer data backup & archiving procedures for real-time SCADA generated data;
- Automate the collection of information and the generation of reports produced by the system;

- Effectively utilize test equipment;
- Perform a variety of difficult and complex tasks in the diagnoses, calibration, installation, and troubleshooting of communication system equipment, security equipment, telemetry based controllers, PLCs and RTUs, primary sensors, and related systems;
- Develop documentation and online help for end users;
- Maintain water distribution system hydraulic model and database;
- Perform journey level installation, maintenance, and repair of control circuits, pressure switches, floats, underground cables, motors, telemetry, copper lines and power output frequency regulators, and transducer recorders;
- Inspect tele-metering, electric controllers, programmable controllers, process meters, analyzers, flow systems, 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/wastewater;
- Read and interpret electrical and instrumentation plans, specifications, blueprints, sketches, wiring diagrams, and schematics;
- Pull, install, splice, and terminate wiring; work on cables underground or from ladder, tower, or truck;
- Thread, bend, and operate portable power drill and other power tools commonly used in water/wastewater utility work;
- Operate and maintain electrical instruments and tools; clean and maintain tools and supplies;
- Inspect equipment installation work performed by contractors and other personnel for workmanship and compliance;
- Estimate labor and material for SCADA/security 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 SCADA section and in performing everyday tasks;
- Document and record all programming, testing, and updates performed;
- Maintain network communication between equipment, controls, field hardware, and SCADA system;
- Respond to emergency situations during 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 electricians/instrumentation technicians; direct the work of assigned workers on a crew;
- Work effectively with others;
- Required to wear respiratory protective equipment to include Self Contained Breathing Apparatus (SCBA);
- Operate Department vehicles;
- Routinely adhere to and maintain a positive attitude toward City and Department goals; and
- Perform related work as required.

QUALIFICATIONS

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/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;
- Linux, Unix, and Windows operating systems, programming and application software;
- Standard programming languages and protocols, such as 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;
- SCADA theory at an advanced level;
- PLC programming theory at an advanced level for testing, troubleshooting, and repairing PLC components and data highway systems;
- Information Technology (IT) related functions (computer operating systems, hardware, network administration, etc.) at an advanced level
- Human-machine interface (HMI) software packages, such as Wonderware, Intellution, or OASIS;
- Data radio systems, wireless network repeaters, Ethernet & serial wireless data radio/modems;
- Terminology used in networking and desktop computer support;

- Principles, methods, and techniques in the design and operation of SCADA and its associated systems equivalent to those used by the Water Department;
- Applicable codes and regulations;
- Industrial electricity and safety practices, precautions, and procedures;
- Tools, materials, methods, and practices of electrical, electronic, 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 circuit;
- Shop mathematics applicable to the electric/electronics trades;
- Software (Microsoft Word, Excel, Access, PowerPoint, Outlook, Internet Explorer, Adobe Acrobat);
- Instrumentation calibration concepts and procedures;
- Appropriate safety precautions and procedures;
- Complex record keeping, documentation, and practices;
- English usage, spelling, grammar, and punctuation;
- General principles of supervision and training.

Ability to:

- Plan, organize, schedule, and monitor work for efficiency, quality, and timeliness;
- Operate PCs, PLCs, HMIs, communications and network test equipment and devices;
- Recognize, analyze, and define a variety of routine to complex programming, communication, electrical, chlorination, and instrumentation problems without close supervision;
- Make sound, independent decisions within established guidelines;
- Apply in-depth understanding of theories and concepts of process automation and control to water utility and water reclamation processes;
- Understand technical specifications of SCADA and apply toward developing special programs related to SCADA;

- Lead and train others in the daily technical and administrative support activities of the SCADA system;
- Correct instrument operating problems and make recommendations for system modifications to meet operational needs without close supervision;
- Perform SCADA network, equipment, software, and hardware configurations accurately and efficiently;
- Troubleshoot hardware and software problems and make or recommend modifications;
- Operate power tools, hand tools and light equipment used in electrical activities; operate specialized test equipment such as milliamp and millivolt calibrators, multimeters, power supplies, and oscilloscopes;
- Perform a wide range of skilled water utility or reclamation security/SCADA/electrical/instrumentation installation, wiring, repair, and maintenance work on low voltage circuits in accordance with safety standards;
- Read, understand, interpret, and apply moderately complex materials including technical manuals, drawings, specifications, layouts, diagrams, blueprints, plans, and schematics;
- Plan and schedule construction and maintenance work assignments;
- Keep accurate records;
- Recognize, report, and/or correct unsafe working conditions;
- Understand and carry out routine to complex instructions furnished in oral, written, or diagrammatic form;
- Make arithmetical calculations involving fractions, decimals, and percentages with speed and accuracy;
- Communicate clearly and concisely, both orally and in writing;
- Establish and maintain effective relationships with those contacted in the course of work;
- Operate a vehicle observing legal and defensive driving practices;
- Respond to call-out or emergencies as required; handle emergency situations as directed;
- Be physically capable of entering permit required confined spaces and wearing Self Contained Breathing Apparatus (SCBA) equipment;
- Operate an atmospheric tester for entry into confined spaces;
- Wear protective respiratory equipment to include SCBA and personal escape respirator;
- Assign tasks, train, and evaluate progress of assigned employees;

- Maintain a driving record that meets vehicle code standards and is acceptable to the Department and its insurance carrier.

MINIMUM QUALIFICATIONS

An employee within this classification may be designated as a “key responder” and as such shall be required to respond to non-normal working hour emergency operational conditions.

Education and Experience:

At least two (2) years of journey level experience in the use of proprietary human-machine interface (HMI) software packages such as Wonderware, Intellution, or OASIS. Must be proficient in the design and operation of SCADA and its 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 SCADA systems design, installation, maintenance, and/or repair (utility/industrial applications preferred) including at least one (1) year 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 SCADA systems design, installation, maintenance, and/or repair (utility/industrial applications preferred) including at least one (1) year of experience in the programming of programmable logic controller (PLCs).

OR

Trade/Military Technical School graduation **and** four (4) years of journey level experience in SCADA systems design, installation, maintenance, and/or repair (utility/industrial applications preferred) including at least one (1) year of experience in the programming of programmable logic controllers (PLCs).

Certificates:

Possession of a valid California Class “C” driver’s license is required upon application. For out-of-state applicants, a valid driver’s license is required and a valid California Class “C” license is required within ten (10) days of appointment (CA Vehicle Code 12505c).

Possession of a Grade II Control Systems Technician certificate, issued by the Instrument Society of America (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 call-outs or emergencies including being on-call.

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 involves exposure to potential physical harm, hazardous chemicals and infectious disease. There is frequent need to stand, sit, stoop, walk, and perform other similar actions during the course of 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 boom truck with lift of 30 to 60 feet, and work to heights of 150 feet. 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: SCADA Analyst

To: SCADA/Instrumentation Supervisor

Job Description:

BOWC Approved:

7/8/2003

Rev:

10/02/2012

5/17/2016

Testing Standards: CS App Review/CS Supp App Review:

CSB Approved:

9/14/2004

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