baywork
bay area water/wastewater workforce development

MISSION-CRITICAL PROFILE

Name: Kenneth White

Organization: San Francisco Public Utilities Commission

Job Category (Check one below):

- ☐ Water Treatment
- ☐ Water Distribution
- ☐ Wastewater Treatment
- ☐ Wastewater Distribution
- ☒ Electronic Maintenance Technician/ Instrument Technician
- ☐ Electrician/Electrical Line Worker
- ☐ Machinist/Mechanic
- ☐ Other

1. Please describe the work you do:

As an Electronics Maintenance Technician for the S.F. PUC Water Supply & Treatment Division, my primary responsibilities include the troubleshooting, repair, calibration, configuration, and installation of our system's process measurement instrumentation and control equipment. Although my job title is Electronic Maintenance Technician, our more commonly known trade name throughout the water, wastewater, power generation, chemical, and other automated process control type industries is Instrument & Control (I&C) Technician.

The specific equipment my group maintains is located at the several water treatment and pumping facilities residing on the San Mateo County peninsula, which is part of the overall Water System that stretches from the Hetch Hetchy reservoir to the City of San Francisco. This also includes the many smaller, remote monitoring and distribution control stations throughout the system watershed.

Typical examples of our process measurement instrumentation & controls include: transmitters, controllers, indicators & recorders, water chemistry analyzers, valve actuators & positioners. Each device measures, monitors, or controls a system process variable or equipment parameter such as water pressure, flow, turbidity, valve position, pump speed, and more. This is accomplished by the device either sending or receiving discrete or analog electronic signals (either by copper wire or wireless radio) to or from our programmable logic controllers (PLC's) which are an integral part of the overall Supervisory Control & Data Acquisition system (SCADA). As I&C Technicians, our goal is to ensure that these devices and all associated sub-components in the instrument loop (such as power supplies, electro-mechanical relays, signal convertors & isolators) up to the PLC I/O terminal connections are functioning accurately and reliably.

Additionally, our group is occasionally tasked with maintaining various Buildings & Grounds type equipment (which may or may not be associated with the water production & delivery processes). This includes performing maintenance on site video surveillance & security systems, including personnel and vehicle access, and various electronic & low voltage electrical components associated with backup electrical power sources (such as emergency generators, UPS, or solar charging stations).

2. What combination of education, vocational training, apprenticeship, experience, and/or skill did you obtain in order to be qualified and selected for your job?

My background is a mixed combination of education, industry training, certifications, and over 25 years hands-on work experience in the defense, electrical power generation, and water treatment industries. After high school, I completed a 2 year vocational-technical program in computer electronics, and then worked for 5 years as an electronics test technician for Unisys Corp. where we manufactured military computer systems for the U.S. Navy. When government spending cuts to the military forced many defense contracting companies to lay off employees, I changed fields and started working for a large power generation utility (Progress Energy Corp) as an entry level power plant equipment operator. It was during this time I took college courses at night to obtain my degree in computer networking. My career path shifted into the I&C field when I completed an instrumentation & control technician apprenticeship at one of the utilities nuclear power generation stations. It was here I received classroom & lab training in process measurement & instrumentation theory, control theory, fluid flow, pneumatics, chemistry, physics, industrial electronics and electrical power, motor controls, distributed control system (DCS), PLC programming, and more.

Becoming an I&C technician has been rewarding. I feel the work is very satisfying, and there are usually good job opportunities available. I have obtained my industry certifications as an ISA CCST (International Society of Automation, Certified Control Systems Technician), and California DHS Water Treatment Operator (T1). After greater than 15 years working in power generation, I changed industries and started working for the SF PUC Water Supply & Treatment Division, which has been a nice transition.

3. What do you like best about your job?

I really like learning the system processes, and also troubleshooting equipment problems side-by-side with the two primary groups we support; the Plant Operation crew and the SCADA (PLC) Technicians. Working with & maintaining continuity between these groups is not only enjoyable, but essential for an I&C Tech to perform his job. To understand this relationship, you must understand the typical troubleshooting process involved with industrial instrumentation & controls.

When an Operator reports a problem, the I&C Tech is contacted to perform the initial assessment, and very often works together with the Operator to determine the root cause of the failure. When I&C troubleshooting is complete and the reason for the failure has been determined, the I&C Tech and the Operator will place the system process in a safe condition to allow for any corrective maintenance. Equally important, by interfacing with the SCADA Tech, the I&C Tech must ensure that his (or her) field instrumentation & controls are configured and scaled properly to correctly work with the SCADA persons' PLC software logic and HMI (Human Machine Interface).

Also important to note, because of the frequent necessity for the I&C Tech to trend system data and access the HMI, including the inherent need to support (and receive support from) these two important groups, it is crucial that the I&C Tech's work shop containing all test equipment, specialized tools, documentation, and critical spare parts are located "on-site" at the main process treatment facility. An analogy of this would be similar to ensuring that a baseball player's "dugout" is located "inside the stadium", right next to the ball field.

4. Please tell us about the projects and activities you have enjoyed most in your work in the water/wastewater field, and what made them rewarding,

I frequently enjoy working with our engineering staff on project installations at our treatment plants. It is very satisfying to see a project completed successfully. I have been asked to specify, quote, and purchase various types of instrumentation & controls. Next, I will perform the setup, programming, installation, functional testing, and final documentation of these devices. Project examples include the replacement of obsolete level transmitters with new ultrasonic units & the replacement of system process controllers.

5. What qualities and capabilities are needed in order for a person in your area of expertise to be successful in the water/wastewater industry?

I think to be successful in the I&C field it very important to have both good technical skills and interpersonal skills. Being able to communicate clearly (both written & verbally) with the diverse group of people you must interface with is just as important as knowing the technical material. If you like working with your hands and solving puzzles, this may be a satisfying career choice for you. Finally, a sense of humor & patience is always helpful, as some people you work with may have difficult personalities.

6. Do you have any advice for an individual who is considering pursuing a career in your field in the water/wastewater industry?

Invest some time with people who do this type of work for advice & to see if the job is right for you. If you decide this is a career path you want to pursue, then start by getting the required education & training you need. In the I&C field, many companies no longer budget for apprenticeship programs or have the available man-power to train new employees on-the-job.

As in other fields, I&C Techs are an aging work-force, and qualified replacements are difficult to find. Today, companies will expect you to know the material and (somehow) have a minimum amount of work related experience before you start. Research colleges & trade schools that provide the training you need. Organizations such as the ISA (International Society of Automation) provide excellent training and certification.

After you learn the theory, it is important that you work directly with the system owners (Operations crew) to learn the processes and equipment. Equally important is understanding the PLC software control logic with the SCADA technicians.

Maintaining a questioning attitude, being thorough, and always self-checking your work will make life much easier for you in this field. The work can be mentally challenging, frustrating, and sometimes tedious. Preparing yourself in advance will make the job much easier and more satisfying. Though not usually physically demanding, there are times where you may be working at heights or below ground, in tight cramped spaces, or exposed to the elements outdoors. There will be times you must be available for “call-out” after normal business hours or on weekends.

Understanding computers and experience with office software applications (spreadsheets, databases, and so on…) including basic networking & data communication is very important. Familiarity with business concepts such as “asset management” will also be very beneficial, as is knowing how to properly use your CMMS (Computerized Maintenance Management System). This will help you learn how to properly track, document & control the thousands of devices you are responsible for maintaining.