



MISSION-CRITICAL PROFILE

Name: Shawn McIntyre

Organization: San Francisco Public Utilities Commission - Water Supply and Treatment

Job Category (Check one below):

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| <input type="checkbox"/> Water Treatment | <input checked="" type="checkbox"/> Electronic Maintenance Technician/ Instrument Technician |
| <input type="checkbox"/> Water Distribution | <input type="checkbox"/> Electrician/Electrical Line Worker |
| <input type="checkbox"/> Wastewater Treatment | <input type="checkbox"/> Machinist/Mechanic |
| <input type="checkbox"/> Wastewater Distribution | <input checked="" type="checkbox"/> Other - Supervisor |

1. Please describe the work you do:

As an Electronic Maintenance Technician Assistant Supervisor, I work along with the technicians performing repairs, calibrations and installations of Instrumentation and Control equipment throughout the East Bay area region of San Francisco/Hetch Hetchy Water Supply and Treatment and distribution system. We are responsible for the maintenance of the devices that control, indicate and regulate the quantity and quality of the water flowing from the Hetch Hetchy reservoirs systems and Calaveras and San Antonio reservoirs, to our customers throughout the SF bay area. We also maintain additional local water source equipment for local customers. To list the instrument and control equipment EMT's repair;

Control, Flow, level, pressure, analytical, temperature, data transmissions, Ultraviolet disinfection systems, Backup power systems (generator switching and UPS's), Seismic sensors and controls, various transducers and various surveillance equipment.

EMT's repair the electronic portions of valve actuators controllers and pumps. These valves range in size from ¼ inch water sample or chemical injection lines, all the way up to 96 inch pipelines such as the Alameda siphons or Bay division pipelines which carry water around and under the bay. We maintain pumps that inject chemicals at mL per minute all the way up to pumps that send up to 40MGD of water.

Programmable Controllers and VFDs, which control speed and efficiency of pumps, mixer motors, chemical injection and valve movement timing.

Flowmeters, pressure and level meters; (differential pressure, ultrasonic, magnetic, turbine/mechanical, coriolis). Water quality is ensured with Turbidimeters, pH, conductivity, Chlorine and various chemical analyzers.

Test equipment normally used by EMT's are; multi-meters, process meters, programmers, pressure meters and gauges, o-scopes. We sometimes work closely with operators, electricians, and plumbers. As EMT's we are usually called upon as "first responders" to system failures. Another challenge is the EMT must recognize where and what other problems may appear to exist when troubleshooting a system. Then report to the corresponding trade for their involvement in the repair.

Once a repair is made, the technician is responsible to focus not only on the ACCURACY of the device, but to understand the difference of PRECISION, to ensure LINEARITY and REPEATABILITY, to check SENSITIVITY and drift.

As a supervisor I also schedule and assign jobs from our reported maintenance requests system to the EMT's. I ensure this database is updated and each job is documented by each tech. I track times for payroll and request other trades for required assistance through our work order system. I add detail items to work orders as required. We create equipment information and calibration data sheets to record data points and configurations of devices.

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?

I earned my College degrees in Computer Technology and Electronic Communications Technology.

I worked for a Semiconductor manufacturer for seven years as a test systems repair technician and then as Chief calibration specialist. I repaired and calibrated environmental and electrical test instruments for Military spec integrated circuit testing. I wrote operational instruction, maintenance docs and trained personnel on calibration procedures.

I then spent the next 19 years at United Airlines as an Avionics Tech, Avionics Engineer and then Communications Specialist.

Having seen the airline industry go through its "ups and downs" I wanted to focus on a more stable career. I began to take a serious interest in the handling and treatment of drinking water. After observing events in 2001 I realized people can go on without traveling by air, but cannot get by without a good source of drinking water.

Around 2006 I began taking courses through CSU Sacramento Office of Water Programs, and also AWWA Water College. Through these courses I then passed my state exams and received certificates for Water Treatment T2 and Distribution D2. I had additionally taken courses at College of San Mateo on "Sensors and DATA Transmission Systems" and "Electronic & Pneumatic Process Control Instrumentation."

3. What do you like best about your job?

I feel that I am in an ideal job. I like working with people, this is the bonus of being in a supervisor position, is being able to have more interactions across the trades, and industry with more individuals. Also I enjoy working closely with each technician. All the while I still get my hands into the technical workings of the equipment and systems which has always been my interest and forte. In the past several years I have become very interested in the water industry so it is very gratifying to now be working in this field. I enjoy working outdoors, on reservoirs, pipelines, hillsides and open fields where many of our "valve lots" reside.

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,

Working in the Sunol valley there has been a recent project to connect multiple flowmeters into the Sunol filter gallery. This gallery is a water gathering system which was built over a hundred years ago when Spring Valley Water Co. owned this portion of our water system. We now were tasked to install modern metering at different sections of this antiquated system. We installed flowmeters which were new to us and connected these to a wireless system to interface to SCADA. There were several challenges of making some of the equipment operate, sometimes non-conventionally; however with help from our engineering department and support from the manufacture reps it has come together.

Another high point is learning the new treatment facility in Tracy, CA. The Tesla UV Treatment facility uses UV light to disinfect Hetchy water before it enters the coast range tunnel. There is a huge amount of state of the art equipment involved in this operation. It will require much maintenance attention into the future.

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?

In order to attain proficiency in instrumentation repair, one must be able to understand basics in science and physics. Besides having a base in electronics theories, you need to understand, for example, the effects of temperature and pressure on air and water. Knowing how the various sensors react to changes beyond what they are designed to detect (for example; crystal piezos, affected by vibrations or sudden temperature changes, or RFI or EMI interference.) The tech needs to know the constants of fluid dynamics, the effects of certain chemicals on materials. Also one should have a knack for software configurations, and programming. With the ever increasing number of micro controlled devices now, leaves open a longer list of parameters which must be taken into account when setting up a particular instrument. One should be aware of the latest developments in electronic designs for system improvements and maintenance. The successful technician is conscientious in his attention to minute details. As some of the slightest bits of error in such a large system can equate to a huge effect which may become rather undesirable.

Most instruments rely on analog communications - which goes along with the nature of the sensors – measuring “real world” real time analog conditions. However with the increase in digital controls, there is need for techs to take on additional challenges of interfacing with digital communications from the instruments. This is also why there is a divide of crafts within the personnel maintaining the complete DCS (Distributed Control System). EMT’s mostly maintain the analog (and some digital) measurements and controls of a device, and interface them to a PLC. There the data is digitized and then handled by SCADA techs who then present the data through HMI indication and control.

Modern technology has brought major improvements from what were once basic mechanical instruments, to now complex sophisticated electronic systems. We need skilled crafts people to learn some math, some science and much electronics, and enjoy working with their hands in the field (pipelines and vaults) and in plants treatment

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

Anyone interested in instrumentation work should first take electronics courses to obtain certification or degree. Then begin their studies with the ISA. The International Society of Automation offers training courses for certification for “Control Systems Technicians”. This is specific to industrial automation and instrumentation. A good source to become familiar with water treatment is the AWWA American Water Works Association.

Also learn to work well with your hands; practice such skills as soldering, running power hand tools and learn about various types of tools that can be used in field work.