



THE METROPOLITAN WATER DISTRICT  
OF SOUTHERN CALIFORNIA

## POSTDOCTORAL RESEARCH ASSOCIATE

<b>Group-Section:</b> Water System Operations Group	<b>FLSA Status:</b> Non-Exempt <b>Bargaining Unit:</b> MAPA	<b>Salary Grade:</b> 46 <b>Job #:</b> Y20
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### JOB SUMMARY

This limited term position will independently conduct highly-specialized applied research studies in various scientific disciplines that support operational, regulatory, and water quality objectives, including, but not limited to, new regulations and/or emerging issues in the water industry. Research will focus on evaluating new technologies, and developing new or improved processes and/or analytical methods as they apply to Metropolitan's drinking water and/or advanced water treatment for potable reuse and distribution systems. This position will also evaluate new technologies, develop new and/or improved processes and methods, and collaborate with universities and subject-matter experts.

### OVERSIGHT

**Supervision Received:** Receives scientific direction from Team, Unit, or Section Manager.

**Supervision Given:** None

### JOB DUTIES GENERAL

1. Pursues external funding, which includes the timely preparation of research proposals and grant applications. May act as Principal Investigator on research grants, conducting research as outlined in the scope of work. This also includes grant budgetary oversight, and timely completion of financial reports, periodic technical progress reports and draft/final project reports. Ensures compliance with grant award requirements and regulations associated with the receipt of external funding.
2. Assists in the design and implementation of applied research projects. Plans, organizes, and conducts daily experimental activities relating to assigned research projects.
3. Supports assigned research projects by completing sample collection, laboratory sample preparation, analytical methods to detect and quantify constituents, and data analysis and interpretation. Recommends additional studies as necessary.
4. Compiles a detailed and accurate notebook which summarizes experiments and records research results. Maintains a computer database of research data; tabulates and displays data for presentation at research conferences and for manuscript preparation; and uses graphics and statistical software to analyze and present data.
5. Operates instrumentation related to area of scientific study.
6. Conducts literature reviews and presents research findings at conferences and internal meetings as required.

7. Utilizes safe laboratory protocols and complies with all established safety requirements for Metropolitan's Water Quality laboratories.
8. Performs other related duties as required.

### **WATER PURIFICATION ENGINEERING**

1. Conducts applied research in areas involving membrane bioreactor (MBR), microfiltration (MF), reverse osmosis (RO), ultraviolet/advanced oxidation process UV/AOP), activated carbon adsorption, conventional filtration, ozonation, and biological filtration systems.
2. Designs and implements bench-, pilot-, demonstration-, and full-scale tests to evaluate removal of emerging chemical constituents and formation of disinfection byproducts.

### **MICROBIOLOGY**

1. Conducts applied research studies on raw source waters and potable water to detect and analyze regulated and unregulated microorganisms (pathogens), and develops methods for their detection and removal using novel techniques and emerging technologies.
2. Evaluates pathogen removal during wastewater treatment as it relates to potable reuse.
3. Utilizes microscopic, cultural, cell culture, and molecular methods as appropriate to investigate microbial occurrence and processes related to drinking water.
4. Operates a variety of laboratory instrumentation including QPCR, microscopes, and centrifuges, using proper operating, maintenance, and safety techniques, including use of BSL-2 practices and facilities.

### **CHEMISTRY**

1. Conducts applied research on emerging chemical constituents in drinking water, including but not limited to, analytical method development, reduction of potential health risks, assessment of treatment performance, and enhanced source control.
2. Investigates newly-identified and emerging chemical constituents in raw source waters, treated potable water, and within treatment processes, including reuse.
3. Operates a variety of complex analytical instrumentation including liquid chromatography, ion chromatography, gas chromatography, and mass spectrometers, and associated data processing components using proper operating, maintenance, and safety procedures.

### **EMPLOYMENT STANDARDS**

#### **MINIMUM QUALIFICATIONS**

**Education and Experience:** Ph.D. in Civil Engineering, Chemical Engineering, Environmental Engineering, Molecular Biology, Microbiology, Chemistry, or a related scientific or engineering discipline, with research experience in water quality, water treatment, potable reuse, chemistry, environmental microbiology, and/or molecular biology from an accredited college or university.

**General Knowledge of:** Current and proposed state and federal drinking water and potable reuse regulations, drinking water treatment processes, and advanced water treatment processes. Experience with relevant laboratory equipment and instrumentation related to area of research, and laboratory safety protocols for working with pathogens at Biosafety Safety Level 2. Experimental design and

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appropriate data analysis and reporting methods, including statistical measures relating to area of research. Quality assurance and quality control procedures, requirements, and guidelines to ensure data integrity and acceptability.

**Water Purification Engineering Knowledge of:**

Water treatment, advanced water treatment for potable reuse, and distribution system operations and their interface with MBR, MF, RO, UV/AOP, activated carbon adsorption, conventional filtration, ozonation, and biofiltration systems.

**Microbiology Knowledge of:**

Molecular biology and microbiology research, including study planning, sample collection, sample preparation in the laboratory, pathogen detection methods, and data analysis. Environmental microbiological processes, including wastewater treatment and recycled water. Appropriate standard and EPA-approved methods and advanced techniques for microbiological analyses. In addition, knowledge of metagenomics and high throughput sequencing (next generation sequencing), including data analysis and interpretation (i.e. bioinformatics).

**Chemistry Knowledge of:**

Analytical methods to detect and quantify chemical constituents in a variety of water matrices, including primary or secondary wastewater effluents, and screening techniques to detect the presence of unknown compounds, especially low molecular weight chemicals that could pass through RO membranes. Theory, principles, practices, methods, chemicals, and agents used in chemical and physical analysis and testing of water; water sample preparation methods; laboratory procedures for water analysis; and methods and processes used in raw water treatment. Operation and maintenance of applicable complex laboratory instrumentation and related computer programs and software, federal EPA methodologies, and quality control techniques.

**General Required Skills and Abilities to:**

Work in a multi-disciplinary research environment and leverage expertise in all disciplines when appropriate. Communicate research data clearly and concisely, both orally and in writing, with both scientific and non-technical audiences. Independently execute scientific research, develop new strategies, and troubleshoot through problems while working cohesively with co-workers, outside consultants, and others encountered in the course of work. Prepare clear, accurate, and concise written reports, and in publication format as required. Independently prepare grant proposals and related budgets, and complete grant applications. Effectively utilize appropriate software to display and communicate research results.

**Water Purification Engineering Skills and Abilities to:**

Analyze and interpret data for Metropolitan's drinking water and advanced water treatment process design criteria to optimize water treatment performance. Develop plans and procedures to address legislative and regulatory requirements. Provide recommendations to ensure compliance with all drinking water and potable reuse water quality regulations.

**Microbiology Skills and Abilities to:**

Design and implement studies and applied research related to monitoring and treatment of pathogens and surrogates. Increase understanding of adverse impacts of microbiological processes and develop mitigation strategies. Evaluate new and alternative microbiological analytical methods. Prepare written and graphical summaries and reports of complex data.

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**Chemistry Skills and Abilities to:**

Design and implement scientific studies and research related to the treatment and monitoring of unregulated chemical constituents and formation of disinfection byproducts, utilizing newly-developed and emerging analytical methods and technologies. Operate complex automated/programmable laboratory instrumentation, and associated computers, programs, and hardware; apply chemistry principles and scientific methods to the development of new methodologies for identifying unregulated and emerging chemical constituents of concern in a variety of water matrices.

**CERTIFICATES, LICENSES, AND REGISTRATIONS REQUIREMENTS****Certificates**

- None

**Licenses**

- Valid California Class C Driver License that allows you to drive in the course of your employment.

**Registrations**

- None

**DESIRABLE QUALIFICATIONS**

None

**PHYSICAL DEMANDS/WORK ENVIRONMENT**

The physical demands and work environment characteristics described here are representative of those that must be met or may be encountered by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions.

**Physical Demands:** The work is sedentary. Typically, the employee may sit comfortably to do the work. However, there may be some walking; standing; bending; carrying of light items such as paper, books, or small parts; driving an automobile, etc. No special physical demands are required to perform the work.

**Work Environment:** Work in a laboratory setting requiring the use of established safety protocols. The work environment also involves everyday risks or discomforts that require normal safety precautions typical of such places as offices, meeting and training rooms, libraries, and residences or commercial vehicles, e.g., use of safe work practices with office equipment, laboratory equipment, avoidance of trips and falls, observance of fire regulations and traffic signals, etc. The work area is adequately lighted, heated, and ventilated. May travel to various sites.

**Vision Requirements:** No special vision requirements.

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