



THE METROPOLITAN WATER DISTRICT  
OF SOUTHERN CALIFORNIA

## OPERATIONS AND MAINTENANCE TECHNICIAN IV (MECHANICAL) (JOURNEY)

<b>Group-Section:</b> Water System Operations - Various	<b>FLSA Status:</b> Non-Exempt <b>Bargaining Unit:</b> AFSCME	<b>Classification:</b> Operations and Maintenance Technician <b>Salary Grade:</b> 42 <b>Job #:</b> T03
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### JOB SUMMARY

Utilizes journey level mechanical skills, experience and knowledge in the practices, procedures, and methods of installing, maintaining, and repairing both general and complex water utility and facility mechanical systems. Monitors and inspects mechanical equipment and related systems for reliable operating condition and performance, including predictive and diagnostic testing; preventive and corrective maintenance; improving equipment and asset capacity and upgrading systems to meet conveyance and distribution, treatment plants, and pumping plants operating and service demands.

Maintains and improves mechanical/electrical equipment related to Metropolitan's significant revenue-generating assets, systems, processes, supporting facilities, and infrastructure including those within treatment plants, pump plants, chemical unloading and transfer facilities, conveyance and distribution structures, reservoirs, hydroelectric plants, and right-of-ways. Employees in this title ensure ongoing reliability and capacity primarily through maintenance activities, to ensure the operational service necessary to convey, store, treat, and distribute water and hydroelectric power effectively to member agencies and other customers.

### Conveyance and Distribution

Activities in conveyance and distribution include inspecting, maintaining, and improving mechanical systems associated with large equipment, infrastructure, and assets such as pumps, turbines, generators, motors, compressors, valves, turnouts and hydraulic systems, pipelines, feeders and canals, control and pressure-relief structures, reservoirs, and other appurtenances and processes related to the effective delivery of water and electric power. Also, activities include operating utility trucks, cranes/rigging and heavy equipment. Operational activities include water flow changes and adjusting flow pressure settings in control and pressure relief structures, including shutdown and outage operations for maintenance such as dewatering, disinfecting and refilling.

### Treatment Plants

Activities in treatment include inspecting, maintaining, and improving the reliability of equipment such as chemical feed systems, ozone generators and related systems, flash mixers, flocculators, filter beds, geared drive equipment, sedimentation basins, tanks, valves, pumps, compressors, piping systems and slide gates, as well as processes such as chemical unloading transporting and transfer systems, reclamation systems, and sludge removal systems. Also, activities include operating cranes/rigging and heavy equipment. Operational activities include those tasks associated with effective water flow and treatment such as operating valves and performing minor adjustments and calibrating chemical feed and similar systems.

### **Pumping Plants**

Activities in pumping plants include operating and maintaining large equipment such as generators and motors, overhead hoists and cranes, compressors and pneumatic systems, hydraulic power units, domestic water systems in plant and residential facilities and other associated pump plant mechanical equipment and systems. Preventive and corrective mechanical maintenance duties include, but are not limited to: lubricating bearing, rebuilding various pumps and valves, repairing and installing piping, troubleshooting and repairing water system equipment failures, lubricating and exercising small and large diameter valves and actuators, rebuilding, replacing and installing pumps, refurbishing and/or rebuilding valves and associated piping, operational duties and high-voltage switching operations.

Work tasks in treatment and pump plants, and conveyance and distribution involve collecting a wide variety of operational process and maintenance data including equipment readings, treatment and conveyance flow information, and water quality samples, to ensure effective operations, equipment/asset maintenance, and protection/security of public health and District assets on a routine and emergency response basis.

### **SUPERVISION:**

#### **Received:**

Work is performed with minimal and at times intermittent on-site supervision. Broad direction is given in terms of operations and maintenance objectives that may require self-initiated work planning, sequencing and coordination of material and tool resources. Detailed guidance and advice is available which may result in the modification of work in varied situations. Performance may be measured by the quantity and quality of work, and operations and maintenance objectives.

Receives oversight from the Team, Unit, Section, Assistant Group, or Group Manager.

#### **Given:**

As a lead may exercise technical and/or functional direction over assigned staff.

Specific attention is given to on-the-job training and development of O&M Technician I, II, and III employees, in order that those employees attain specialized knowledge and skills to advance to O&M Technician IV.

### **JOB DUTIES**

Performs journey level mechanical maintenance tasks and activities at treatment plants, aqueduct pump plant, chemical unloading and transfer facilities, conveyance and distribution structures, reservoirs, hydroelectric plants, along right-of-ways, and at other facilities utilizing equipment, processes and systems to ensure ongoing reliability of water and power delivery.

### **Conveyance and Distribution**

1. Performs a wide variety of journey mechanical preventive and corrective maintenance (PM/CM) on conveyance and distribution related systems, processes and facilities to ensure conveyance and distribution reliability that may include work on: valves of various sizes, configuration and operation control (manual and motor) including pneumatic and hydraulic systems, pipelines, feeders, aqueducts, canals, siphons, reservoirs, pumps, motors, generators, lubrication and cooling equipment, control and pressure relief structures and associated equipment/assets and cranes and rigging systems.

2. Completes preventive and corrective activities on large-scale water conveyance and distribution infrastructure and assets including aqueducts, tunnels, pipelines, siphons, feeders, canals and reservoirs, to maintain distribution system integrity, capacity, and operational reliability.
3. Utilizes state-of-the-art technology, perform predictive and preventive maintenance activities to determine infrastructure and rotating and moving equipment wear. Assist with the performance of predictive analysis through laser alignment, vibration and oil analysis to anticipate maintenance needs and determine appropriate actions to maintain and enhance equipment life and uptime.
4. Performs and/or assist with preventive and corrective maintenance of mechanical/electrical systems necessary for standby power generators and associated systems to maintain operational readiness during outages or other emergencies.
5. Performs preventive and corrective maintenance on valves of differing size, configuration, age, and operating control systems. May include lubrication, exercising and repair, and replacement of parts to ensure effective water movement and valve longevity.
6. Accomplishes preventive and corrective maintenance on pressure relief and pressure control structures to ensure reliable operation of water distribution components and functions. Perform PM and CM to ensure structure integrity, safety, security and appearance standards.
7. Operates and monitor valves to make flow changes and adjust pressure settings for routine operations, shutdowns, or other operating conditions requiring safe and effective transfer or adjustment in the movement of water.
8. Rebuilds and repair conveyance and distribution infrastructure, equipment, systems and processes as necessary, requiring planning, fabrication of parts, welding and/or assembly and installation to bring equipment/processes to as-designed operating condition.
9. Performs and/or assist with improving mechanical systems associated with construction and improvement projects such as building and infrastructure enhancements directly associated with conveyance and distribution systems including modifications, rebuilding, and relocating structures, assets, and equipment.
10. Completes, at times in collaboration with Specialist level or Control Technicians, complex predictive, preventive, and corrective maintenance on mechanical/electrical systems associated with large motors, pumps, generators, turbines, valves, varied equipment and other mechanical related systems associated with the effective movement of water and power.
11. Utilizes instrumentation to test and monitor the capabilities, limits, and effectiveness of equipment and subsystems of equipment, as well as other mechanical processes and systems directly related to power and water systems, to measure the ongoing effectiveness of those systems and to assure the quality of maintenance and/or improvements.
12. Performs water analysis such as PH, hardness, chlorine and ammonia at various facilities including reservoirs, to test for contaminants and other essential water quality elements.
13. Inspects, tests, calibrates, and record readings for a variety of mechanical/electrical systems and equipment to meet reliable equipment life and service expectations, including motors, compressors, valves, pumps, flow meters, cranes and lifts, chemical storage and feed systems, basins and related equipment to ensure effective water operations and movement.

14. Assists with the planning and coordination of scheduled PdM, PM, and CM, as well as unplanned outages, shutdowns, and other emergency situations, to minimize equipment downtime and interruption of service to member agencies or other customers.

### **Treatment Plants**

1. Performs a wide variety of journey mechanical preventive and corrective maintenance on water treatment related systems, processes and facilities. PM and CM activities includes work on oxygen generation and ozone equipment, valves, pneumatic and hydraulic control systems, pumps, generators, lubrication and cooling equipment, chemical feed systems and associated equipment.
2. Completes PM and CM activities on large-scale water treatment assets, systems and processes including flocculators, filter beds, flash mixers, conveyor systems, sedimentation basins, storage tanks, slide gates, pipes, valves and varied drive and control systems to maintain plant integrity, capacity and operational reliability.
3. Utilizes state-of-the-art technology, perform or assist with predictive and preventive maintenance activities to determine equipment wear, including predictive analysis through laser alignment, vibration and oil analysis to anticipate maintenance needs and determine appropriate actions to maintain and enhance equipment uptime.
4. Performs and/or assist with preventive and corrective maintenance on mechanical/electrical systems necessary for standby power generators and associated systems to maintain operational readiness during outages or other emergencies.
5. Performs preventive and corrective maintenance on Chemical Unloading Facility equipment, processes and systems to include piping, valves, structures, standpipes, metering and monitoring equipment, alarms and test equipment. Operate and monitor valves, gauges and other chemical transfer and mixing systems to ensure safe and effective transfer and distribution of chemicals and movement of rolling stock or other lading equipment.
6. Repairs and rebuilds treatment equipment, systems and processes as necessary requiring appropriate planning, fabrication of parts, welding and/or assembly and installation to bring equipment/processes to designed operating condition.
7. Performs and/or assists with improving mechanical systems associated with construction and improvement projects such as building and plant enhancements directly associated to water treatment systems including modifications, rebuilding and relocating plant assets and equipment.
8. Completes, at times in collaboration with Specialist level or Control Technicians, complex predictive, preventive, and corrective maintenance on mechanical/electrical systems associated with large motors, pumps, generators, turbines, valves, varied treatment process equipment, and other mechanical related systems associated with treatment plants.
9. Utilizes instrumentation to test and monitor the capabilities, limits, and effectiveness of equipment and subsystems of equipment, as well as other mechanical processes and systems directly related to power and water systems, to measure the ongoing effectiveness of those systems and to assure the quality of maintenance and/or improvements.
10. Inspects, tests, calibrates, and records readings for a variety of mechanical/electrical systems and equipment to meet reliable equipment life and service expectations, including motors, compressors,

valves, pumps, flow meters, cranes and lifts, chemical storage and feed systems, basins, tanks, valves and related equipment to ensure effective water output of treatment plants.

11. Assists with planning and coordinating scheduled predictive, preventive and corrective maintenance, as well as unplanned outages, shutdowns, and other emergency situations, to minimize equipment downtime and interruption of service to member agencies or other customers.

### **Pumping Plant**

1. Performs a wide variety of journey mechanical preventive and corrective maintenance on aqueduct pumping plant related systems, processes and facilities to ensure aqueduct plant reliability that may include work on: large rotating equipment, overhead hoists and cranes, rigging systems, compressors, hydraulic power units, valves of various sizes, configuration and operation control (manual, hydraulic and motor) including pneumatic and hydraulic process controls.
2. Performs a wide variety of preventive and corrective maintenance on pipelines, feeders, aqueducts, canals, siphons, reservoirs, pumps, motors, generators, lubrication and cooling equipment, control and head gate structures and associated equipment/assets.
3. Rebuilds and repairs aqueduct pumping plant infrastructure, equipment, systems and processes as necessary, requiring planning, fabrication of parts using general machine shop equipment, welding and/or assembly and installation to bring equipment/processes to as-designed operating tolerances and conditions.
4. Completes preventive and corrective activities on large-scale water conveyance and distribution infrastructure and assets including aqueducts, delivery lines, head gates and associated structures, pipelines, aqueduct sand traps, canals, radial gates and reservoirs, to maintain distribution system integrity, capacity, and operational reliability.
5. Utilizes state-of-the-art technology such as SCADA, perform predictive and preventive maintenance activities to determine infrastructure and large rotating and moving equipment wear. Assist with the performance of predictive analysis through laser alignment, vibration and oil analysis to anticipate maintenance needs and determine appropriate actions to maintain and enhance equipment life and uptime.
6. Performs and preventive and corrective maintenance of mechanical/electrical systems.
7. Performs preventive and corrective maintenance on valves of differing size, configuration, age, and operating control systems. May include lubrication, exercising and repair, and replacement of parts to ensure effective water movement and valve longevity.
8. Performs preventive and corrective maintenance to ensure structure integrity, safety, security and appearance standards of all pumping plant and residential facilities.
9. Improves mechanical systems associated with construction and improvement projects such as building and infrastructure enhancements directly associated with pumping plant and residential systems including modifications, rebuilding, and relocating structures, assets, and equipment.
10. Completes, at times in collaboration with Specialist level or Control Technicians, complex predictive, preventive, and corrective maintenance on mechanical/electrical systems associated with large motors, pumps, generators, valves, varied equipment and other mechanical related systems associated with the effective movement of water and power.

11. Utilizes instrumentation to test and monitor the capabilities, limits, and effectiveness of equipment and subsystems of equipment, as well as other mechanical processes and systems directly related to power and water systems, to measure the ongoing effectiveness of those systems and to assure the quality of maintenance and/or improvements.
12. Performs water analysis such as PH, hardness, chlorine and turbidity measurement at various facilities including reservoirs, to test for contaminants and other essential water quality elements. Responsible for collection of bacteriological samples.
13. Performs preventive and corrective maintenance on circulating, fire and domestic water distribution systems and swimming pool maintenance. When necessary maintain septic and associated systems.
14. Inspects, tests, calibrates, and records readings for a variety of mechanical/electrical systems and equipment to meet reliable equipment life and service expectations, including motors, compressors, valves, pumps, flow meters, cranes and lifts, chemical storage and feed systems, sand traps and related equipment to ensure effective water operations and movement.
15. Assists with the planning and coordination of scheduled predictive, preventive and corrective maintenance, as well as unplanned outages, shutdowns, and other emergency situations, to minimize equipment downtime and interruption of service to member agencies or other customers.
16. Performs operational duties which include: setting up, starting, stopping, and securing main pump units, monitoring, inspecting, recording, calculating, and reporting pump plant operations data and operating conditions of main motors, pumps, power transformers, and related pump plant equipment, water flow changes, including dewatering and refilling pipelines in association with system maintenance and repairs, earthquake and emergency response, switching operations and safety related inspections of facilities and systems. Handle and log hazardous materials and maintains storage area.

**EMPLOYMENT STANDARDS  
MINIMUM QUALIFICATIONS**

**Education and Experience:**

High school diploma or GED in addition to a minimum of 6 years in a mechanical maintenance position in a pump plant, treatment plant, hydroelectric or conveyance and distribution facility or similar environment.

**OR**

High school diploma or GED in addition to the attainment of journey level skills through a recognized mechanical trade training program.

Journey level experience as demonstrated by practical application of general and advanced techniques and practices specific to the operation, maintenance, and repair of mechanical systems in treatment or pump plants, conveyance and distribution, and/or power generation systems, and related apparatus.

**Required Knowledge of:** Theories and practices of mechanical systems and their application to large-scale mechanical/electrical systems and equipment related to hydroelectric power plants, water treatment and distribution systems, as well as general and utility facility mechanical systems, applying methods, practices, machine shop equipment for metal fabrication, and tools to ensure reliable operations for the movement and treatment of water, generation of power, and optimization of assets and equipment to meet operational demands within established limits and standards, contemporary maintenance reliability analysis and troubleshooting methods including determination of failure causes, diagnostic analysis through failure mode, and root cause analysis, using traditional analog and precision digital instruments to ensure critical measurements and alignments as part of diagnostic and predictive maintenance, including laser alignment equipment, analog and digital meters, calipers and other tools related to close tolerance analysis and work, and safety practices and regulations for operating or working near electrical and/or mechanical equipment, high voltage systems, hazardous materials, and associated tools and equipment.

**Required Skills and Abilities to:** Understand and interpret mechanical and electrical engineering data necessary to effectively implement predictive, preventive, corrective, and improvement activities. Frequently perform or assist in the drafting, design, layout and development of procedures, manuals, orders and similar documentation to ensure safe operating techniques and/or for training, to interpret complex schematics, blueprints, electrical diagrams, instructions, manuals, operating and maintenance procedures, and specifications related to water treatment, conveyance and distribution and pump plant, as well as building, facility and hydroelectric power systems/equipment, and experience to utilize tools and diagnostic equipment to test and monitor equipment and asset condition, as well as repair, install and replace equipment necessary to meet water and electrical generation demand and/or capacity, use and maintain mechanical/electrical tools and equipment traditionally used in hydroelectric plants, pump plants, treatment plants, and within water and power control and distribution infrastructure and facilities, apply and guide others in adhering to safety practices and regulations for operating or working near electrical and/or mechanical equipment, high voltage systems, hazardous materials, and associated tools and equipment.

### **CERTIFICATES, LICENSES and REGISTRATIONS REQUIREMENTS**

Employees in this position may be required to obtain and maintain the following certifications, licensing and registrations:

**Treatment:**

- Valid Drivers license from state of residency equivalent to a California Class A, B, and/or C with appropriate commercial license endorsements
- Crane Certifications
- Welding Certification
- Chemical Responder Certification
- Forklift Certification
- Manlift Certification
- Diver Certification
- MWD High Voltage Switching Certification

**Conveyance and Distribution:**

- Valid Drivers license from state of residency equivalent to a California Class A, B, and/or C with appropriate commercial license endorsements
- Crane Certifications
- Welding Certification
- Chemical Responder Certification
- Forklift Certification
- Manlift Certification
- Diver Certification
- MWD High Voltage Switching Certification
- Water Distribution Certification

**Aqueduct Pumping Plants:**

- Valid Drivers license from state of residency equivalent to a California Class A, B, and/or C with appropriate commercial license endorsements
- Crane Certifications
- Water Treatment Certification Grade II
- Welding Certification
- Chemical Responder Certification
- Forklift Certification
- Manlift Certification
- Diver Certification
- MWD High Voltage Switching Certification

**PHYSICAL DEMANDS/WORK ENVIRONMENT**

**Expectations of Hours of Service, Emergency and Stand-by Service:**

Employees in this position may be required to work off-shift hours and/or stand-by service to address operational needs and emergencies as required. Pump plant personnel assigned stand-by are required to respond within 15 minutes. May be required to work extended periods away from the normal reporting location.

**Physical Demands:**

Heavy tasks may require lifting and carrying items weighing up to 50 pounds, with intermittent need to lift and carry materials and/or equipment weighing up to 100 pounds with assistance. Frequently requires pushing, pulling, turning and positioning parts, assemblies, equipment and tools weighing as much as 100 pounds with assistance. May be required to lift and move heavy items with the assistance of others and with lifting devices such as jacks, hoists and cranes of varied types and capacities. Physical effort includes frequent walking, stooping, bending, reaching, standing, crawling, climbing, kneeling and sitting for long periods of time. At times may be required to use Self Contained Breathing Apparatus (SCBA) or other respiratory filtration and personal protection devices.



MWD

*Metropolitan Water District of Southern California*

**Work Environment:**

Work is performed indoors and outdoors at large pumping, treatment, hydroelectric or control facilities, or associated assets, under all types of conditions including extreme temperatures, open and confined spaces ranging from crawl space to sub-structures as well as varied types of terrains. Job tasks frequently require working from heights and functioning from lifts, hoists, scaffolds, and cranes over surfaces ranging from earthen materials to concrete, steel and water. Work frequently is conducted in close proximity to high volume/pressurized water, as well as exposed, electrically energized equipment including high voltage systems. The work environment often involves exposure to equipment and tools producing high levels of noise, as well as potentially dangerous materials, chemicals, and machinery that require careful adherence to extensive safety precautions, rules and regulations.