



**MECHANIC INDUSTRIAL  
(Instrumentation and Controls)**

**DEPARTMENT:** James City Service Authority/Utility Operations/Support Section

**NATURE OF WORK:**

Performs highly skilled work in the maintenance and repair of electrical and electronic systems used in water production and wastewater collection facilities. These skills include in-depth knowledge of complicated control applications and the programming of automated systems.

Duties are performed under the general supervision of the Support Section Superintendent.

**ESSENTIAL FUNCTIONS OF THE JOB:**

Installs, troubleshoots, and repairs electrical equipment and systems in well and lift station facilities to include motors, switch gear, lighting systems, power distribution systems, fire alarms, and chemical feeders.

Installs and troubleshoots 4-20 ma control loops, Proportional Integral Derivative (PID) loops, and related components.

Redesigns and rewires control systems in water production and wastewater collection facilities. Designs, modifies control circuits for new and relocated electrical equipments systems.

Installation, maintenance, and programming of IGBT variable frequency drives, and solid-state soft start/stop controllers.

Required to program, troubleshoot, and repair industrial modular programmable logic controllers.

Performs complex generator and engine control work and various types of automatic bus transfer switching systems.

Assists in the development and creation of schematics and ladder diagrams using computer-based software.

Inspects new well and lift station facilities before they are accepted by the County.

Identifies, selects, and works with warehouse and vendors to order all materials and equipment necessary to maintain efficient operation of electrical systems and equipment.

Performs electrical construction projects to include rigid EMT and PVC conduit installation; installation and termination of cables; installation of control panels and motor controllers in sizes up to 600 ampere at 480 volts.

Performs repair and installation of low voltage D.C. SCADA/telemetry interface. Performs electronic repairs and adjustments to SCADA/telemetry circuit boards.

Practices continuous learning through individual study, classroom training, seminars, and conferences.

Performs work safely in accordance with department safety procedures and the County Safety Program. Operates equipment safely and reports any unsafe work condition or practice to supervisor.

May be required to report to work to serve customers during emergency conditions. May be assigned to report to a different time and location and perform different duties as necessary.

Performs related work as required.

### **JOB LOCATION AND EQUIPMENT OPERATED:**

Duties are performed primarily at various well facilities and lift stations throughout the County. Requires driving to work locations. Work is often performed under unpleasant and hazardous conditions. Operates a variety of hand and power tools, measuring and test instruments used in electrical/electronic systems repair.

### **REQUIRED KNOWLEDGE, SKILLS, AND ABILITIES:**

Extensive knowledge of the methods, practices, tools, and equipment used in electrical/electronics equipment repair.

Extensive knowledge of electrical construction and maintenance, including installation of all sizes of electrical conduits, cables, wires, switchgear, and automatic starting equipment.

Thorough knowledge of National Electrical Code applicable to installation, maintenance, and repair work.

Ability to troubleshoot and repair industrial Programmable Logic Controllers (PLC).

A working knowledge of PLC programming software to include I/O ladder logic.

A working knowledge of Variable Frequency Drive programming software.

Familiarity with and ability to install and troubleshoot 4-20 ma control loops, Proportional Integral Derivative (PID) loops, and related components.

Ability to diagnose and correct highly complex electrical control systems and related equipment problems.

Ability to read and work from electrical drawings, schematics, and control circuit diagrams.

### **MINIMUM QUALIFICATIONS:**

Requires high school diploma or equivalent, supplemented by vocational, trade school, or technical training in industrial electrical work; extensive experience in the maintenance and repair of industrial class electric motors and mechanical electrical systems in water production/wastewater systems; experience with varied software systems, and ability to troubleshoot software or hardware problems, or any equivalent combination of training and experience providing the required knowledge, skills, and abilities.

**NECESSARY SPECIAL QUALIFICATIONS:**

Must have the ability and tolerance to function in an environment that requires the use of respiratory protection devices.

Must possess a valid Virginia driver's license and have an acceptable driving record based on James City County criteria.

Must possess or be able to obtain within six months of employment a valid Journeyman Electrician license issued by the Commonwealth of Virginia.

Requires a post-offer criminal history and sex offender record check.

Requires a post-offer physical.

Requires the ability to travel among various work sites.

Date: April 2007

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# IDENTIFICATION OF GENERAL APTITUDES AND PHYSICAL REQUIREMENTS

Position Title: Mechanic Industrial  
Department: James City Service Authority

Position Number: 215  
Division: Utility Operations/Support Section

The Americans with Disabilities Act requires that we identify the general aptitudes and physical requirements needed to perform the job listed above. Individuals who have the position must be able to perform all essential job functions unaided or with reasonable accommodation.

**I. Mental Abilities:** General learning ability. The ability to “catch on” or understand instructions and underlying principles.

- Ability to understand and follow oral instruction
- Ability to understand and follow written instruction
- Ability to guide and/or give instructions
- Ability to make decisions in accordance with established procedures and policies
- Not essential to job function

**II. Verbal Abilities:** Ability to understand meanings of words and ideas associated with them and to use them effectively. To comprehend language, to understand relationships between words, and to understand meanings of whole sentences and paragraphs. To present information or ideas clearly.

## 1. Speaking/Talking:

- Answer telephone, radio or switchboard
  - Communicating with County officials
  - Communicating with general public
  - Communicating with vendors
  - Communicating with supervisors and/or with other employees
  - Communicating with other \_\_\_\_\_
- Not essential to job functions

## 2. Hearing/Listening:

- Ability to distinguish between different tones
- For communication with County officials, public, vendors, supervisors and/or other employees
- Not essential to job function.

## 3. Reading: (ability to read and understand text)

- Essential to job function
- Not essential to job function

**III. Numerical:** Ability to perform arithmetic operations quickly and accurately.

- Ability to mentally perform accurate two digit calculations
- Ability to perform accurate calculations aided by a calculator, adding machine or measurement device

**IV. Spatial Abilities:** Ability to comprehend forms in space and understand relationships of plane and solid objects. May be used in such tasks as blue print reading and in solving geometry problems. Frequently described as the ability to “visualize” objects of two or three dimensions, or to think visually of geometric forms.

- Essential function
- Not essential function

**V. Motor Coordination:** Ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed. Ability to make a movement response accurately and quickly.

**1. Manual Dexterity:** Ability to move the hands easily and skillfully. To work with the hands in placing and turning motions.

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Use telephone      | <input checked="" type="checkbox"/> Manipulate computer keyboard and mouse                         |
| <input type="checkbox"/> Use switchboard               | <input type="checkbox"/> Use postage machine   |
| <input checked="" type="checkbox"/> Use radio/console  | <input checked="" type="checkbox"/> Use hand tools   |
| <input checked="" type="checkbox"/> Use a calculator   | <input checked="" type="checkbox"/> Use power tools  |
| <input checked="" type="checkbox"/> Use a copy machine | <input checked="" type="checkbox"/> Other: <u>Must be able to use delicate measuring equipment</u> |
| <input checked="" type="checkbox"/> Use a fax machine  | <input type="checkbox"/> Not essential to job function   |

**2. Finger Dexterity:** Ability to move the fingers and manipulate small objects with the fingers rapidly or accurately. For example: electrical wiring.

- Essential to job function
- Not essential to job function

Explain: \_\_\_\_\_

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**VI. Physical Demands:**

1. **Strength:** The quality, state or property of being strong. The power to withstand strain, force, or stress.

Please check (✓) in appropriate boxes below.

	Ability to manipulate materials and/or equipment (lbs)						Frequency of Manipulation		
	5-	5-10	10-15	15-25	25-50	50+	Occasionally	Frequently	Continuously
<b>Lift</b>						✓		✓	
<b>Push/Pull</b>						✓	✓		
<b>Hold/Carry</b>						✓		✓	

Manipulation done from:  ground to waist     waist level     waist to shoulder     above shoulder  
(Check all that apply)

Not essential to job function:  Lift     Push/Pull     Hold/Carry (Check all that apply)

2. **Climbing:** To move up or mount by using the hands or feet.

- | <u>Ladders</u>  | <u>Stairways</u>                                       | <u>Steps</u>   |
|---|--|--|
| <input type="checkbox"/> Step stool                       | <input type="checkbox"/> 1 flight                      | <input type="checkbox"/> 1-2                                   |
| <input checked="" type="checkbox"/> 8' to 10' step ladder | <input checked="" type="checkbox"/> 2 flights          | <input type="checkbox"/> 2-3                                   |
| <input checked="" type="checkbox"/> Extension ladder      | <input type="checkbox"/> 3 or more flights             | <input type="checkbox"/> 3-4                                   |
| <input type="checkbox"/> Other _____                      | <input type="checkbox"/> Other _____                   | <input checked="" type="checkbox"/> Other: as many as 25 _____ |
| <input type="checkbox"/> Not essential to job function    | <input type="checkbox"/> Not essential to job function | <input type="checkbox"/> Not essential to job function         |

3. **Ability to Stand, Sit, Walk, and Run:**

Please check (✓) in appropriate boxes below.

	Duration (hours/day)						Occasionally	Frequently	Continuously
	0-1	1-3	3-5	5-7	7-9	9+			
<b>Stand</b>			✓					✓	
<b>Sit</b>		✓					✓		
<b>Walk</b>		✓						✓	
<b>Run</b>									

If walking or running, over what type of terrain?  flat     rough     both

Not essential to job function:  Stand     Sit     Walk     Run (Check all that apply)

**4. Stooping, Kneeling, Crouching, and /or Crawling:**

To bend forward or down from the middle of the waist or the middle of the back, to bend downwards, to lower oneself and/or to move freely on hands and knees.

**Daily Amounts**

- 0-5x       5-20x       20-50x       50+x  
 Other \_\_\_\_\_       Not essential to job function

**5. Reaching, Handling, Fingering, and/or Feeling:**

To stretch out, extend, or put forth a bodily part. To touch or grasp something, by extending or stretching. To touch, lift, hold, or operate with the hands.

**Daily Amounts**

- 0-5x       5-20x       20-50x       50+x  
 Other \_\_\_\_\_       Not essential to job function

**6. Seeing:** To perceive or comprehend by the sense of sight.

Essential to job function: These characteristics are necessary (Check all that apply)

- Peripheral vision
- Night vision
- Focus (distinctness or clarity)
- Color perception (discriminate between colors)
- Depth perception (determine distance relationship between objects)

**VII. Driving:** The ability to transfer or convey in a vehicle.

<b>Transmission</b>	<b>Standard</b>	<b>Automatic</b>	<b>Multi-Gears</b>
Car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Van	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Small Truck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Medium Truck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Large Truck	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Truck w/Equipment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Heavy Bus Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not essential to job function	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (list) _____			