



USUAL & CUSTOMARY JOB ANALYSIS/DESCRIPTION

JOB TITLE:	Electrician/Instrumentation Technician
DEPARTMENT:	Maintenance
EMPLOYER:	Vallejo Sanitation and Flood Control District 450 Ryder Street, Vallejo, California 94590
DATE PREPARED:	8/4/2004
WORK SCHEDULE/HOURS:	8-9 hours per shift, 4-5 days per week
EMPLOYEE:	
D/I:	
CLAIM NUMBER:	

Employer's Business: The employer, Vallejo Sanitation and Flood Control District, is a government agency responsible for the collection and treatment of wastewater from the sanitary sewer system and the protection from storm water.

Job Functions

Overview:

Under general supervision of the Electrical/Electronic Maintenance Supervisor, to perform or assist in preventative maintenance, repair, adjustment, overhaul, calibrations, replacement and new installation of electrical, instrumentation, computerized control systems, and computer network equipment. Work under the appropriate applicable provisions of the Electric Code, approved plans and specifications and standard industry practice.

Essential Functions:

The employee inspects, repairs, installs and maintains switch gears, transformers, relays, motors, generators, and a variety of other types of electrical/electronic equipment for proper operation.

The employee designs, lays out, assembles, installs and test electrical/electronic apparatus, equipment and wiring for power, lighting and instrumentation, telemetry, variable frequency drives, and control circuits.

The employee estimates time and materials needed to perform various tasks under his/her control.

The employee calibrates and maintains meters, analyzers, recorders, control and feed systems of the following nature, but not limited to electric, electronic pneumatic, hydraulic and mechanical.

The employee maintains an inventory of parts, materials and supplies used in the electrical/instrument shop.

The employee keeps accurate maintenance records.

The employee reviews plans and project designs.

The employee installs and maintains telemetry systems.

The employee performs programming of computerized control equipment (PCC's, DCS, PC's).

The employee repairs, replaces, installs and maintains electrical equipment located at the plant and at 40 pump stations located within the District. The employee spends approximately ¼ of the time performing field tasks.

The employee utilizes a variety of hand and power tools including drills, wire cutters, pliers, long nose pliers, wire strippers, combination square, pry bar, tape measure, torpedo level, pipe wrench, socket adapters, pipe wrenches, crimpers, ratchets, wrenches, screwdrivers, drills, reciprocating saw, testing equipment, hammers, diagnostic tools, Alan wrenches, and other related items.

The employee operates a 1-ton flatbed truck equipped with an automatic transmission to travel to and from District sites or within the plant. Includes ascending one step, maneuvering a steering wheel, pressing 2 foot pedals in conjunction with using a cushioned seat. Alternatively, the employee operates an electric golf cart to travel within the plant.

The employee, as needed, utilizes a shovel or breaking bar to access electric equipment or dig a trench, average trench is a depth of up to 2' and less than 10' in length.

The employee, as needed, ascends or descends a step or extension ladder, 6 to 40' to access wiring or light fixtures.

The employee installs conduit and wiring, includes utilizing screw guns and drills to secure conduit and fasteners. The employee, thereafter with or without assistance of coworkers, feeds wiring through the conduit and retrieves the wiring at the opposing end. Wiring varies in thickness up to ½" wiring, on average 12 gauge.

The employee utilizes a keyboard, mouse and views a monitor to enter/retrieve data including programs that control plant equipment, reports, documents, e-mail correspondence, work orders, etc.

The employee utilizes a writing utensil to complete paperwork associated with completed work orders, logs or drawings/sketches of electrical installations, updating plans, etc.

The employee operates a forklift to relocate supplies or equipment, includes ascending/descending 2 steps, maneuvering a steering wheel and levers on the right side, pressing 2 foot pedals in conjunction with using a cushioned seat.

The employee utilizes a manual bender to bend pipe. Includes placing the pipe on the bender and utilizing a pole to bend the pipe.

The employee utilizes an electric drill press located in the shop, includes setting the material/item on the drill press fixture, and utilizing a handle in a downward motion to drill a hole.

The employee utilizes an electrical conduit bender positioned on 3 wheels, includes relocating the bender, retrieving and inserting conduit, pressing a button to activate the electric conduit bender.

The employee operates an automated pipe threader located at the plant shop. Includes retrieving and inserting a pipe, turning and securing a clamp, turning knobs and activating the machine to thread or cut the pipe.

The employee operates an electric overhead crane to retrieve and relocate parts or equipment within the shop. Includes connecting a crane hook to the part and utilizing a control box to relocate the desired item.

The employee, as needed, performs confined space entries, includes working with a crew of 2 to 3 employees. Includes setting a tripod over an opening, wearing safety equipment, and utilizing specialized testing equipment including gas detectors, lowering tools, parts and equipment to inspect, service or repair equipment.

The employee ascends/descends single or multiple stair flights to access equipment, multiple floors and as needed, accessing building rooftops.

The employee utilizes a metal hook to remove and replace manhole lids, approximately 2 times per month. Alternatively, the employee removes electric vault covers, with the assistance of a coworker.

The employee accesses pump stations located at ground or below ground level. Underground pump stations includes opening the lid, utilizing a fixed vertical ladder or stairs up to 25' in depth to access the pit. The employee performs a variety of tasks including inspecting, troubleshooting and as needed repairing pump station equipment. The employee, as needed, utilizes a rope and a bucket to lower needed tools, parts including a motor into the pump station.

The employee, as needed, works in a railed man lift to access higher parts/equipment located within the plant.

The employee utilizes a 4-wheeled cart or 2-wheeled dolly to relocate supplies, tools, parts or equipment.

The employee reads books, manuals, sketches or plans.

Marginal Functions:

The employee maintains a clean work shop, includes utilizing a push broom to sweep the shop floor and dustpan to retrieve trash/debris.

Minimum Qualifications

EDUCATION & EXPERIENCE

Minimum four (4) years paid full time experience in electrical and instrument repair. Two (2) years vocational or technical school, shop courses or equivalent in-plant or on-the-job training.

KNOWLEDGE, SKILLS & ABILITIES

Knowledge of principles, theory and practices of electricity, electronics, instrumentation, computers, communication systems, pneumatics, hydraulics and mechanics as they apply to maintenance and repair of equipment and machinery commonly found in a wastewater treatment facility, tools, materials, methods and practices of electrical, electronic and instrumentation trade.

Ability to handle a variety of tasks without close supervision.

Ability to handle emergency situations

Ability to recognize and correct unsafe working conditions

Ability to order and request materials, supplies and services as required

Ability to recognize, define and solve a variety of mechanical, instrumentation and electrical/electronic problems

Ability to apply principles of logic to define and solve complex problems

Ability to perform ordinary arithmetic, algebraic, and geometric procedures in standard practical applications

Ability to interpret a wide variety of manuals, drawings, and specifications, including layouts, blueprints and schematics, in book, manual and mathematical or diagrammatic form

Ability to communicate clearly and concisely in English both orally and in writing

Ability to walk on uneven surfaces

Ability to wear a respirator

Ability to enter and perform work in a confined space

Ability to work in inclement weather

Must be able to accept criticism from supervisors, coworkers and subordinate employees

LICENSE(S)

California Certificate of Completion of Electrical Apprenticeship or CWEA
Electrical/Instrumentation Technologist Grade 1
Must possess a valid Class C California Driver's License at the time of employment. The ability to drive District vehicles is a specific requirement for this position. For that reason, it is the employee's responsibility to maintain a driving record that is acceptable to the District's insurance carrier or be subject to dismissal.

WEIGHED ITEMS	Manual bender – 15 pounds Computer tower – 26 pounds Motor – 60 to 70 pounds Battery – less than 50 to 105 pounds Power supply – 20 pounds 17” to 19” computer monitor – 39 to 50 pounds Water pump – 30 pounds 20’ extension ladder – 50 pounds 2” X 10’ conduit – 33 pounds Rack with 8 wire spools – less than 50 pounds #6/500’ spool of wiring – 60 pounds Extension/stepladder – 70 pounds Spool of 12 gauge wiring – 10 pounds ¾” /50’ pipe bundle Tool bag – less than 10 pounds Oscilloscope – 30 pounds Toolbox – 29 pounds Light fixture – 26 to 29 pounds 24” manhole lid – 150 pounds 36” manhole lid – 200 pounds Manhole frame – 150 pounds
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Physical Demands

For the purpose of determining frequency of activity, this job analyst refers to an eight-hour workday.

STANDING	Frequency: Duration: Surfaces: Associated Tasks:	2 to 4 hours. Seconds to less than 15 minutes at a time. Concrete, asphalt, dirt, metal grating, grass, gravel, all possible. Servicing, repairing, replacing, installing and maintaining electrical equipment located at the plant or pump station, utilizing various hand or power tools, shoveling, installing conduit, utilizing a manual bender, operating a drill press, electric conduit bender, working in a railed man lift, removing or replacing manhole lids.
WALKING	Frequency: Duration: Surfaces: Associated Tasks:	2 to 4 hours. Seconds to less than 15 minutes at a time. Concrete, asphalt, dirt, metal grating, grass, gravel, all possible. Within the plant, to and from pump stations, utilizing a cart or dolly, transporting tools, equipment and parts, shoveling.
SITTING	Frequency: Duration: Surfaces: Associated Tasks:	1 to 3 hours. Less than 15 minutes to ½ hour at a time. Cushioned vehicle seat or office chair. Working at a desk station in conjunction with utilizing a computer, driving a golf cart or pickup truck to travel within the plant or to and from field sites.

KNEELING/ CROUCHING/ SQUATTING	Frequency: Duration: Surfaces: Associated Tasks:	Less than 15 minutes to 1 hour. Seconds to less than 15 minutes at a time. Concrete, asphalt, dirt, metal grating, grass, gravel, all possible. Repairing, replacing, installing and maintaining electrical equipment located in the plant or at a pump station in conjunction with utilizing hand or power tools inspecting equipment, shoveling, retrieving or setting items on or off lower shelves or ground level, installing conduit, wiring, removing or replacing parts.
CRAWLING	Frequency: Duration: Surfaces: Associated Tasks:	1 time per year, approximately ½ hour to 1 hour. Seconds to less than 5 minutes at a time. Metal, gravel, wood. Accessing equipment through an attic, underneath equipment while inspecting or repairing.
LAYING ON BACK/STOMACH	Frequency: Duration: Surfaces: Associated Tasks:	2 hours per month. Seconds to ½ hour at a time. Concrete or steel. Connecting or disconnecting wiring, accessing a control panel, equipment, pumps, maintaining wet well equipment
CLIMBING/ BALANCING	Frequency: Duration: Surfaces: Associated Tasks:	0 to 40 times. Seconds to less than 2 minutes at a time. Ladder, stair steps. Ascending/descending ladders to access equipment, stairs to access multiple floors/plant rooms/equipment, ascending/descending one step to operate the truck or golf cart.
BENDING		
Waist:	Frequency: Duration: Associated Tasks:	Less than 15 minutes to 1 hour. Up to 15 minutes at a time. Repairing, replacing, installing and maintaining electrical equipment located in the plant or at a pump station in conjunction with utilizing hand or power tools inspecting equipment, shoveling, installing conduit, wiring, removing or replacing parts. The motion is in a forward direction 5 to 65-degrees per occurrence.
Head/Neck:	Frequency: Duration: Associated Tasks:	3 to 4 hours. Seconds to less than 5 minutes at a time. Aiding visually, during normal body mechanics, maintaining equipment, utilizing a writing utensil to complete notes, digging, utilizing a variety of hand or power tools, installing conduit, inspecting equipment, operating automated equipment including a drill press, pipe threaders, conduit benders.
Wrists:	Dominant Hand: Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	2 to 4 hours. Less than 1 hour. Less than ½ hour. 2 to 3 hours. Seconds to less than 15 minutes at a time. Driving in conjunction with maneuvering a steering wheel, utilizing a shovel, utilizing a variety of basic or power tools including wrenches, drills, screwdrivers, saws, testing equipment, wire strippers, pry bar, shovel, installing or replacing parts, installing conduit, wiring.

TWISTING/ROTATING		
Waist:	Frequency: Duration: Associated Tasks:	Less than 5 minutes to 1 hour. Seconds to less than 15 minutes at a time. Accessing equipment, includes working in restricted or confined spaces, maintaining pump stations, working on a ladder in conjunction with accessing pipes, installing conduit and wiring. The motion is center to the right back to center or center to the left back to center less than 20-degrees per occurrence.
Head/Neck:	Frequency: Duration: Associated Tasks:	2 to 3 hours. Seconds to less than 5 minutes at a time. Aiding visually, driving, during normal body mechanics, working in restricted or confined spaces, utilizing hand or power tools, shoveling, working on a ladder in conjunction with inspecting and accessing equipment. The motion is center to the right back to center or center to the left back to center less than 45-degrees per occurrence.
Wrists:	Dominant Hand: Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	Up to 2 hours. Less than ½ hour to 1 hour. Less than ½ hour. 1 to 1 ½ hours. Seconds to less than 10 minutes at a time. Utilizing screwdrivers, shovel, basic tools including pliers, crimpers, wire strippers, testing equipment, Alan wrenches, installing, removing or replacing parts.

UPPER EXTREMITY USE:	Dominant Hand: [indicate LEFT or RIGHT]
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REACHING		
Primary Reach Zone: (elbows bent at waist level, hands in forward extension)	Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	1 to 2 hours. Less than ½ hour. 0 Less than 1 to 1 ½ hours. Seconds to less than 15 minutes at a time. Utilizing a computer keyboard, mouse to enter or retrieve data, programming plant equipment.
Above Shoulder Level	Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	Less than ½ hour to 4 hours. Alternated with bilateral. Alternated with bilateral. Less than ½ hour to 4 hours. (up to 4 hours during projects) Seconds to less than 10 minutes at a time. Retrieving or setting items on and off higher shelves, installing conduit including fasteners, pipe, wiring, replacing lighting.
Between Waist and Shoulder Level	Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	3 ½ to 6 hours. Less than 1 to 2 hours. Less than ½ hour. 2 ½ to 5 hours. Seconds to less than 15 minutes at a time. Driving in conjunction with maneuvering a steering wheel, utilizing a dolly or cart to transport supplies or equipment, utilizing a variety of hand and power tools including wrenches, strippers, ratchets, crimpers, etc., utilizing a shovel or breaking bar, relocating ladders, utilizing a manual bender, drill press, electric conduit bender, automated pipe threader, utilizing a metal hook to remove or replace manhole lids.
Below Waist Level	Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	Less than 15 minutes to 1 hour. Less than 15 minutes. Less than 15 minutes. ½ hour to 1 hour. Seconds to less than 5 minutes at a time. Repairing, replacing, installing and maintaining electrical equipment located in the plant or at a pump station in conjunction with utilizing hand or power tools inspecting equipment, shoveling, retrieving or setting items on or off lower shelves or ground level, installing conduit, wiring, removing or replacing parts.
PUSHING/ PULLING	Frequency Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	½ hour to 4 hours. Less than 15 minutes to 1 hour. Less than 15 minutes. Less than 15 minutes to 3 ½ hours. Seconds to less than 15 minutes at a time. Inserting wiring through conduit, utilizing a shovel or breaking bar, dolly or cart to transport materials, equipment, utilizing a manual bender to bend pipe in conjunction with pushing or pulling and using one leg to support the manual bender, removing or installing parts.

LIFTING/CARRYING		
0 to 10 lbs.	Objects: Frequency Dominant: Non-Dominant: Bilateral: Distance: Height: Associated Tasks:	Paperwork, writing utensil, radio, telephone, drills, wire cutters, pliers, long-nosed pliers, wire strippers, pry bar, tape measure, pipe wrench, socket adapters, crimpers, ratchets, screwdrivers, drills, reciprocating saws, testing equipment, diagnostic tools, Alan wrenches, shovel, breaking bar, screws, nuts, bolts, fasteners, pipe wiring, metal hook, sketches, plans, tool bag, conduit. 3 to 6 hours. 1 to 2 hours. Less than ½ hour. 2 ½ to 5 ½ hours. Less than 100 feet. Ground to shoulder or above. Utilizing writing utensil, radio, telephone, drills, wire cutters, pliers, long-nosed pliers, wire strippers, pry bar, tape measure, pipe wrench, socket adapters, crimpers, ratchets, screwdrivers, drills, reciprocating saws, testing equipment, diagnostic tools, Alan wrenches, shovel, breaking bar, screws, nuts, bolts, fasteners, handling paperwork, pipe wiring, metal hook, sketches, plans, tool bag, conduit.
11 to 25 lbs.	Objects: Frequency Dominant: Non-Dominant: Bilateral: Distance: Height: Associated Tasks:	Manual bender, power supply, wiring, 6' ladder, conduit. Less than ½ hour to 1 hour. 0 0 Less than ½ hour to 1 hour. Less than 50 feet. Ground to shoulder or above. Utilizing a manual bender, power supply, wiring, 6' ladder, conduit.
26 to 50 lbs.	Objects: Frequency Dominant: Non-Dominant: Bilateral: Distance: Height: Associated Tasks:	Ladder, battery, toolbox, computer tower, monitor, water pump, 20' extension ladder, 2" X 10' conduit, wire spools, light fixture. 5 to 10 times. 0 0 5 to 10 times. Less than 100 feet. Ground to shoulder or above. Retrieving and relocating a ladder, battery, toolbox, computer tower, monitor, water pump, 20' extension ladder, 2" X 10' conduit, wire spools, light fixture.
51 to 75 lbs.	Objects: Frequency Dominant: Non-Dominant: Bilateral: Distance: Height: Associated Tasks:	Ladder with assistance, battery, #6/500' wiring spool, extension/stepladder. 2 to 4 times per week. 0 0 2 to 4 times per week. Less than 24 feet. Ground to waist level. Ladder with assistance, battery, #6/500' wiring spool, extension/stepladder.
75 to 100 lbs.	Objects: Frequency Dominant: Non-Dominant: Bilateral: Distance: Height: Associated Tasks:	Not a job requirement.

100+ lbs.	Objects: Frequency Dominant: Non-Dominant: Bilateral: Distance: Height: Associated Tasks:	Battery, manhole lid. 2 to 4 times per month. 0 0 2 to 4 times per month. Less than 5 feet. Ground to waist level. Retrieving and relocating a battery, utilizing a metal hook to remove or replace a manhole lid, combination of pushing, pulling, partial lifting, lifting.
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HAND DEMANDS

Simple Grasping	Frequency: Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	3 to 6 hours. Less than 1 to 2 hours. Less than ½ hour. 2 ½ to 5 hours. Seconds to less than 15 minutes at a time. Driving in conjunction with maneuvering a steering wheel, relocating hand tools, wiring, utilizing various hand tools in conjunction with repairing, servicing and maintaining equipment, handling manuals, books, relocating wiring, miscellaneous parts.
Power Grasping	Frequency: Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	½ hour to 3 hours. Less than 15 minutes to 1 hour. Less than 15 minutes. Less than 15 minutes to 2 ½ hours. Seconds to less than 15 minutes at a time. Inserting wiring through conduit, utilizing a shovel or breaking bar, dolly or cart to transport materials, equipment, utilizing a manual bender to bend pipe in conjunction with pushing or pulling and using one leg to support the manual bender, removing or installing parts, utilizing wrenches, a pry bar, utilizing a shovel or breaking bar, relocating a step or extension ladders, battery, conduit, motors, power supplies, light fixtures.
Fine Manipulation	Frequency: Dominant: Non-Dominant: Bilateral: Duration: Associated Tasks:	Less than 1 to 3 hours. Less than ½ hour to 1 hour. Less than ½ hour. 1 to 2 ½ hours. Seconds to less than 15 minutes at a time. Utilizing a computer keyboard, mouse, writing utensil, handling small parts, bolts, nuts, screws, wiring, small components.

SPECIAL ENVIRONMENT	Outdoors, all weather conditions Possible exposure to fumes, dust, odors, noise Works indoors Confined space entries
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MACHINES/TOOLS	Writing utensil	Computer, keyboard, mouse, monitor	Dolly	Cart
	Metal hook	Electric cart	Pickup truck	Round or square point shovel
	Drill	Wire cutters	Wire strippers	Long-nose pliers
	Pry bar	Tape measure	Pipe wrench	Crimpers
	Socket adapters	Wrenches	Screwdrivers	Drills
	Reciprocating saw	Testing equipment	Hammers	Diagnostic tools
	Alan wrenches	Man lift	Forklift	

ADDITIONAL REQUIREMENTS: Depending on the exposure, the employee is required to wear foot, hand, respiratory, eye, face, hearing, head, and fall protection equipment. For confined space entries the employee is required to wear a self-contained breathing apparatus and fall protection equipment.

EMPLOYER COMMENTS:	
This Job Analysis accurately represents the duties of a Electrical/Electronic Maintenance Person to the best of my knowledge.	
EMPLOYER CONTACT NAME:	
EMPLOYER SIGNATURE:	DATE:

EMPLOYEE COMMENTS:	
This Job Analysis accurately represents the duties of an Electrical/Electronic Maintenance Person to the best of my knowledge. I understand that I cannot add hours to the physical demands breakdown if the total would then be greater than the number of hours in an average workday.	
EMPLOYEE NAME:	
EMPLOYEE SIGNATURE:	DATE: