



## **ELECTRICAL HIGH VOLTAGE**

Meets California OSHA Requirements  
Integrated Water Services, Inc.  
(the Company)



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## **Purpose**

The purpose of this program is to prevent injuries due to electrical exposure to high voltage for employees and contractors when working in California.

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## **Scope**

This program is applicable at every California work area where high voltage electrical exposure may occur. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Company employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

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## **Purpose**

The purpose of this program is to set forth procedures for the safe use of high voltage electrical equipment, tools, and appliances at the Company.

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## **Responsibilities**

### **Managers/Supervisor**

The Safety Manager will develop electrical safety programs and procedures in accordance with CAL/OSHA requirements and/or as indicated by events and circumstances.

Operations Managers and Supervisors are responsible for ensuring that only qualified employees and or qualified contractors perform electrical repairs or installations.

Operations Managers are also responsible for ensuring all applicable electrical safety programs are implemented and maintained at their locations.

Employees are responsible to use electrical equipment, tools, and appliances according to this program, for attending required training sessions when directed to do so and to report unsafe conditions to their supervisor immediately.

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## **General Requirements for High Voltage Systems**

### **Safe Access to Electrical Equipment**

All work locations shall be safely accessible whenever work is to be performed. Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment. Illumination shall be provided as needed to perform the work safely.

- A clear working space must be maintained in the front, back and on each side of all electrical enclosures and around electrical equipment for a safe operation and to permit access for maintenance and alteration.
- A minimum two-foot working floor space in front of panels and enclosures shall be painted yellow.
- Employees may not enter spaces containing exposed energized parts unless adequate illumination is provided. Illumination shall be provided as needed to perform the work safely.



- Housekeeping in distribution rooms must receive high priority to provide a safe working and walking area in front of panels and to keep combustible materials to the minimum required to perform maintenance operations.
- All enclosures and distribution rooms must have "Danger: High Voltage – Authorized Personnel Only" posted on the front panel and on entrance doors.
- Flammable materials are strictly prohibited inside distribution rooms (Boxes, rags, cleaning fluids, etc.)
- When an employee works in a confined or enclosed space that contains exposed energized parts, the employee shall isolate the energy source and turn off the source and lock and tag out the energy source (Only qualified electricians can work on an exposed energy source).
- Protective shields, protective barriers or insulating materials as necessary shall be provided.

### **Company Responsibilities**

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The Company shall furnish such safety devices and safeguards as may be necessary to make the employment or place of employment as free from danger to the safety and health of employees as the nature of the employment reasonably permits. The Company shall examine or test each safety device at such intervals as may be reasonably necessary to ensure that it is in good condition and adequate to perform the function for which it is intended. Any device furnished by the Company found to be unsafe shall be repaired or replaced.

Tools used for electrical work must be inspected before use. Employees shall be instructed to inspect each safety device, tool or piece of equipment, each time it is used and to use only those in good condition. The Company shall require the use of safety devices and safeguards where applicable. Defective equipment and tools shall be tagged and placed out of service.

#### **Insulated Equipment Is Provided for Electrical Work**

Insulating equipment designed for the voltage levels to be encountered shall be provided and employees shall be instructed to use the equipment. No person, firm, or corporation, or agent of same, shall require or permit any employee to perform any function in proximity to energized high-voltage lines; to enter upon any land, building or other premises and there engage in any excavation, demolition, construction, repair or other operation; or to erect, install, operate or store in or upon such premises any tools, machinery, equipment, materials or structures (including scaffolding, house moving, well drilling, pile driving or hoisting equipment) unless and until danger from accidental contact with high-voltage lines has been effectively guarded against..

#### **Electrical Work May Only Be Performed by Qualified Workers**

Only qualified electrical workers shall work on energized conductors or equipment connected to energized high-voltage systems. Except for replacing fuses, operating switches or other operations that do not require the employee to contact energized high-voltage conductors or energized parts of equipment, clearing "trouble" or in emergencies involving hazard to life or property, no such employee shall be assigned to work alone. Employees in training, who are qualified by experience and training, shall be permitted to work on energized conductors or equipment connected to high-voltage systems while under the supervision or instruction of a qualified electrical worker.

#### **Observers**

During the time work is being done on any exposed conductors or exposed parts of equipment connected to high-voltage systems, a qualified electrical worker, or an employee in training, shall be in close proximity at each work location to:



- Act primarily as an observer for the purpose of preventing an accident, and
- Render immediate assistance in the event of an accident. Such observer will not be required in connection with work on overhead trolley distribution circuits not exceeding 1,500 volts D.C. where there is no conductor of opposite polarity less than 4 feet there from, or where such work is performed from suitable tower platforms or other similar structures.

#### **Suitable Temporary Barriers or Barricades**

Covers or barriers must be installed on boxes, fittings and enclosures to prevent accidental contact with live parts. Suitable temporary barriers or barricades shall be installed when access to opened enclosures containing exposed energized equipment is not under the control of an authorized person.

In locations where electric equipment is likely to be exposed to physical damage, enclosures or guards shall be so arranged and of such strength as to prevent such damage.

Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter.

#### **Placement of Warning Signs Near Overhead Power Lines**

The Company will post and maintain in plain view of the operator and driver on each crane, derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver or similar apparatus, a durable warning sign legible at 12 feet reading: "Unlawful To Operate This Equipment Within 10 Feet Of High-Voltage Lines of 50,000 Volts or Less." The erection, operation or dismantling of any boom-type lifting or hoisting equipment, or any part thereof, closer than the minimum clearances from energized overhead high-voltage lines set forth shall be prohibited.

#### **Overhead and Energized High-Voltage Power Lines**

Safe guards shall be in place when working on or near overhead power lines. The Company nor any person, firm, or corporation, or agent of same, shall require or permit any employee to perform any function in proximity to energized high-voltage lines; to enter upon any land, building, or other premises and there engage in any excavation, demolition, construction, repair, or other operation; or to erect, install, operate, or store in or upon such premises any tools, machinery, equipment, materials, or structures (including scaffolding, house moving, well drilling, pile driving, or hoisting equipment) unless and until danger from accidental contact with said high-voltage lines has been effectively guarded against.

#### **Safe Clearance Distance During Operations of Boom-Type Lifting or Hoisting Equipment from Overhead Power Lines**

The erection, operation or dismantling of any boom-type lifting or hoisting equipment, or any part thereof, closer than the minimum clearances from energized overhead high-voltage lines set forth is strictly prohibited.

#### **Safe Limit of Approach Distance**

A safe limit of approach distance is maintained by workers. When performing work with live line tools, minimum clear distances shall be maintained. Conductor support tools, such as link sticks, strain carriers, and insulator cradles, shall be permitted to be used provided that the clear insulation is at least as long as the insulator string or the minimum distance specified for the operating voltage. When performing work with live line tools, minimum clear distances in CCR 2940.2 shall be maintained.



### **Requirements Before Work is Performed on Exposed Energized Parts of Equipment or Systems**

Work shall not be performed on exposed energized parts of equipment or systems until the following conditions are met:

- Responsible supervision has determined that the work is to be performed while the equipment or systems are energized.
- Involved personnel have received instructions on the work techniques and hazards involved in working on energized equipment.
- Suitable personal protective equipment and safe guards (i.e., approved insulated gloves or insulated tools) are provided and used.

Conductive measuring tapes, ropes or similar measuring devices and conductive fish tapes shall not be used when working on or near exposed energized conductors or parts of equipment. Conductive fish tapes shall not be used in raceways entering enclosures containing exposed energized parts unless such parts are isolated by suitable barriers.

### **Lock Out/Tag Out**

- While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both.
- If any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both.
- All electrical equipment and systems shall be treated as energized until tested or otherwise proven to be de-energized.
- Per the Company policy all electrical will be performed only by qualified and licensed electrical contractors who are familiar with the use of special precautionary techniques, PPE, insulating and shielding materials and insulated tools. Any equipment being made ready for maintenance will be locked out using the Company's Control of Hazardous Energy – Lock Out/Tag Out Program. Lockouts are performed by the Safety Manager, Shop Foreman or Branch Manager. Designated employees in some branches may be trained by local management to lock out equipment. If live sources are to be worked it will only be performed with the knowledge of local management. Only certified electricians may work on electric circuit parts or equipment.
- Authorized Person duties after the required work on an energized system or equipment - The authorized person shall be responsible for removing from the work area any temporary personnel protective equipment and reinstalling all permanent barriers or covers.
- Authorized personnel will be trained in lock out/tag out procedures.
- Affected personnel will be notified when lock out/tag out activities are being performed in their work area.

### **Inspections**

- Employees shall be instructed to inspect each safety device, tool or piece of equipment. Employees shall be instructed to inspect each safety device, tool or piece of equipment, each time it is used and to use only those in good condition.
- The Company requires the use of safety devices and safeguards where applicable.
- The use of a hard fixed GFCI or a portable GFCI adapter shall be used with all portable hand tools, electric extension cords, drop lights and all 110-volt equipment.



- Defective insulating equipment is removed from service. Insulating equipment found to be defective or damaged shall be immediately removed from service. A system, such as tagging, must be in place to ensure defective equipment must not be used by other workers.

#### **Marking of Insulated Equipment and/or PPE with The Latest Test Date or The Next Required Testing Date**

- Insulated gloves, sleeves and blankets must be visually inspected and electrically re-tested periodically at prescribed intervals or when found to be damaged or defective. Gloves, sleeves and blankets shall be marked to indicate compliance with the re-test schedule and shall be marked with either the date tested, or the date the next test is due.

#### **Repairs**

- Only Qualified Personnel, who have been authorized by the department supervisor or manager, may make repairs to supply cords on electrical tools and to extension cords.
- The names of employees authorized to make repairs will be posted in the workplace.
- Only certified electricians shall be allowed to make repairs to electrical equipment and wiring systems.
- The supervisor obtaining the services of a certified electrician is responsible to verify the electrician's credentials.
- Employees shall not enter spaces containing exposed energized parts unless qualified and proper illumination exists to enable employees to work safely.
- Employees shall not wear conductive apparel such as rings, watches, jewelry, etc. (unless they are rendered non-conductive by covering, wrapping, or other insulating means) while working on or near open energized equipment this includes batteries on trucks, forklifts, phone backup systems or other such equipment.
- If employees are subject to handle long dimensional conductor objects (ducts or pipes), steps for safe work practices shall be employed to ensure the safety of workers.

#### **Ladders**

- Only approved, non-conductive ladders, may be used when working near or with electrical equipment, which includes changing light bulbs.
- Ladders must be either constructed of wood, fiberglass, or have non-conductive side rails.
- Wood ladders should not be painted, which can hide defects, except with clear lacquer.
- When using ladders, they shall be free from any moisture, oils, and greases.

#### **Switches, Circuit Breakers and Disconnects**

- All electrical equipment and tools must have an on and off switch and may not be turned on or off by plugging or unplugging the supply cord at the power outlet.
- Circuit breaker panel boxes and disconnects must be labeled with the voltage rating.
- Each breaker within a breaker panel must be labeled for the service it provides.
- Disconnect switches providing power for individual equipment must be labeled accordingly.

#### **Contractors**

- Only approved, certified, electrical contractors may perform construction and service work on the Company or client property.
- It is the Manager/Supervisors responsibility to verify the contractor's certification.

**Fire Extinguishers**

- Approved fire extinguishers must be provided near electrical breaker panels and distribution centers.
- Water type extinguishers shall not be located closer than 50 feet from electrical equipment.

**Equipment Grounding**

- All gas compressors, air compressors, separators, vessels, etc. shall be grounded by means of using a lug and ground strap, nominal in size to a ½" bolt or larger, attached to a ground rod six feet or longer.
- Equipment bonding jumpers shall be of copper or other corrosion-resistance material.
- The transfer of hazardous or flammable material from a metal or plastic container with a flash point of 100 degrees F or less shall have a ground strap from the container and attached to the skid or a ground rod placed in the ground.

**Training**

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All affected employees will be trained in high voltage electrical safety requirements and the training shall be documented.

Safe work practices shall be employed to prevent electric shock or other injuries resulting for either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized.

**Electric Shock-CPR**

- If someone is discovered that has received an electric shock and is unconscious, first check to see if their body is in contact with an electrical circuit. Do not touch a person until you are sure there is no contact with an electrical circuit.
- When it is safe to make contact with the victim, begin CPR if the person's heart has stopped or they are not breathing.
- Call for help immediately.