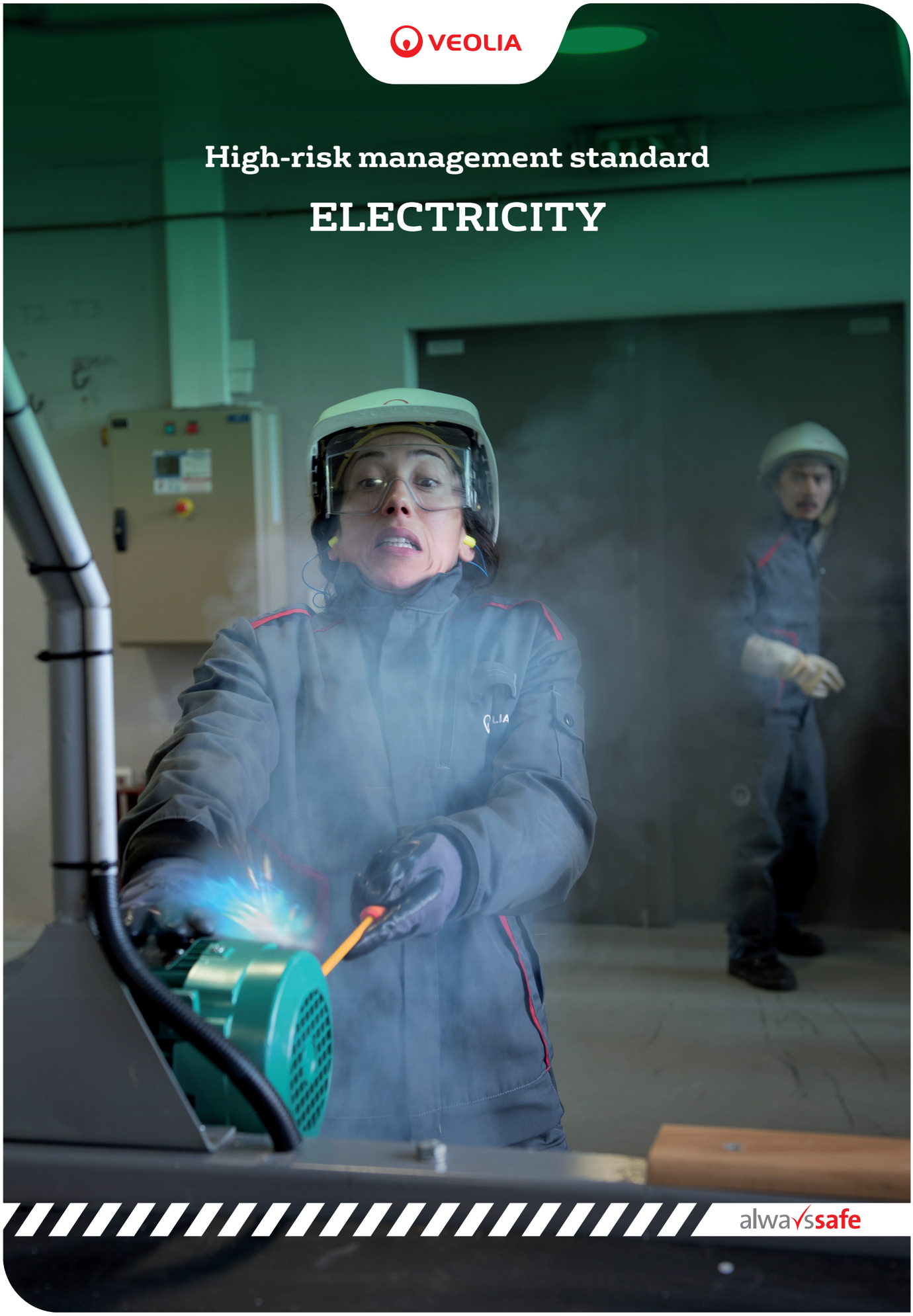
VEOLIA

High-risk management standard

ELECTRICITY



always safe

Operations implicating electricity are very frequent among the works operated by Veolia throughout the world. With the use of electricity comes a wide array of hazards, which can cause serious injuries or prove fatal for workers. The aim of this standard is to establish strict procedures to prevent those risks.

It is vital for all site staff to know and follow the established safe protocols as detailed in this document. Only trained and competent persons may perform activities related with electrical works.

SCOPE:
This document applies to all activities and sites of Veolia. Contractors of Veolia must also comply with this standard. It provides practical guidance for persons conducting a business or undertaking on how to manage the health & safety risks associated with electrical works.

> Summary

Electrical risks are a major cause of death and serious injury in Veolia workplaces all over the world caused directly or indirectly by electricity. More broadly, the most common electrical risks and causes of injuries are:

- Electric shock causing injury or death. The electric shock may be received by direct or indirect contact, tracking through or across a medium, or by arcing. For example, electric shock may result from indirect contact where a conductive part that is not normally energised becomes energised due to a fault. Electric shocks from faulty electrical equipment may also lead to indirect injuries, including falls from ladders, scaffolds or other elevated work platforms.
- Arcing, explosion or fire causing burns. The injuries are often suffered because arcing or explosion or both occur when high-fault currents are present.
- Electric shock from “step-and-touch” potentials.
- Toxic gases causing illness or death. Burning and arcing associated with electrical equipment may release various gases and contaminants.
- Fire resulting from an electrical problem.

Other injuries or illnesses may include muscle spasms, palpitations, nausea, vomiting, collapse and unconsciousness.

Workers using electricity may not be the only ones at risk—faulty electrical equipment and poor electrical installations can lead to fires that may also cause death or injury to anyone working nearby.

Consequently, Veolia prohibits energized low voltage and high voltage electrical works in all activities and in all countries except for testing.

In the exceptional case of some works would require to be realized under energized low voltage and high voltage, an authorization request must be completed before the operation.

This request must contain at least:

- **The evidences of the necessity of this operation,**
- **The demonstration that no other technique exists to carry out this power off,**
- **The risk analysis related to the operation (made by a competent person, duly qualified), to determine the additional human, oragnisational and technical requirements to guarantee that the operation is permanently secured.**

This written requested authorization must be submitted to the business unit (BU) director who will authorize (or not) the operation, based on the transmitted elements and evidences.

Finally, if authorized by the business unit (BU) director, this work under energized low and high voltage must be made only by qualified workforce according to a rigorous process.

Many actors have health and safety duties in relation to electrical risks.

A person conducting a business has the primary duty to ensure, as far as reasonably practicable, that workers and other persons are not exposed to electrical risks arising from the business or undertaking. This duty requires eliminating electrical risks or, if that is not reasonably practicable, minimising the risks so far as is reasonably practicable.

Designers, manufacturers, importers, suppliers and installers of electrical equipment and installations that could be used for work must ensure, so far as is reasonably practicable, that they are without risks for health and safety, and that they are designed and manufactured so that electrical risks are eliminated or, if this not reasonably practicable, minimised so far as is reasonably practicable.

Director of Business unit, have a duty to exercise due diligence to ensure that the business or undertaking complies with the local regulation and the Veolia Standards. This includes taking reasonable steps to ensure that the business or undertaking has and uses appropriate resources and processes to eliminate or minimise electrical risks at the workplace.

Workers must take care for their own health and safety and not adversely affect the health and safety of other persons. Workers must comply with any instruction and cooperate with any policy or procedure relating to health and safety at the workplace. This means that if electrical equipment is provided by the person conducting the business or undertaking, the worker must use it in accordance with the information, instruction and training provided on its use.

1.0 > Definitions/Glossary

Approach distance for live parts:
Approach distances are one way of separating people from hazards. An approach distance is the minimum space from live parts that should be maintained by a person or an object held by or in contact with that person. The approach distances in specified zones should consider different levels of technical knowledge and items of plant.

Guarding of live parts:
Live parts of electric equipment operating at 50 volts or more must be guarded against accidental contact by cabinets or other forms of enclosures, or by any of the following means:

- By location in a room, vault, or similar enclosure that is accessible only to qualified persons.
- By partitions or screens arranged so that only qualified persons will have access to the space within reach of the live parts. Any openings in such partitions or screens must be sized and located so that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them.
- By location on a balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons.

Approach distance for overhead electric lines:
Approach distances are one way of separating people from hazards. An approach distance is the minimum space from an energised overhead electric line that should be maintained by a person or an object held by or in contact with that person. The approach distances in specified zones should consider different levels of technical knowledge and items of plant.

Authorised persons:
Authorised persons are workers who have successfully completed a recognised training course in overhead line and/or electrical equipment hazards, and are appointed by the Electricity Supply Authority or by Veolia

Unauthorised persons:
Anyone not qualifying as authorised persons.

Safety observer:
The safety observer is a person specifically assigned to the role of observing the work activities in the vicinity of energised overhead electric lines and associated electrical equipment.
This person should have successfully completed specific training so he/she is competent to observe the work and are able to implement control measures in an emergency. The safety observer should alert workers, crane or plant operators when approach distances may be about to be breached or if other unsafe conditions arise. The safety observer should monitor work close to Zone B overhead lines to ensure no workers, plant or equipment enters Zone B (see Figures 3 and 4).

Competent person:

- A licensed or registered electrician or any other person permitted to carry out or supervise electrical work under relevant country, state or territory legislation.
- For any other case, a person who has acquired through training, qualification or experience and the knowledge and skills to carry out the task.

De-energised: separated from all sources of supply but not necessarily isolated, earthed, discharged or out of commission.

Electrical equipment: any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that:

- Is used for controlling, generating, supplying, transforming or transmitting electricity at a voltage greater than extra-low voltage.
- Is operated by electricity at a voltage greater than extra-low voltage.

- Is part of an electrical installation located in an area in which the atmosphere presents a risk for health and safety from fire or explosion.
- Is, or is part of, an active impressed current cathodic protection system.

Electrical equipment does not include any apparatus, appliance, cable, conductor, fitting, insulator, material, meter or wire that is part of a motor car or motorcycle if:

- The equipment is part of a unit of the vehicle that provides propulsion for the vehicle.
- The electricity source for the equipment is a unit of the vehicle that provides propulsion for the vehicle.

Electrical installation: a group of items of electrical equipment that:

- Are permanently electrically connected together.
- Can be supplied with electricity from the works of an electricity supply authority or from a generating source.

Energised (live): connected to a source of electrical supply or subject to hazardous induced or capacitive voltages.

High-risk operating environments: all Veolia operating sites except offices. These are workplaces with operating conditions where:

- The normal use of electrical equipment exposes the equipment to operating conditions that are likely to result in damage to the equipment or a reduction in its expected life span, including conditions that involve exposure to moisture, heat, vibration, mechanical damage, corrosive chemicals or dust.
- Electrical equipment is moved between different locations in circumstances where damage to the equipment or to a flexible electricity supply cord is reasonably likely.
- Electrical equipment is frequently moved during its normal use.

Isolated: disconnected from all possible sources of electricity supply and rendered incapable of being made energised without premeditated and deliberate action.

Residual current device (RCD):
An RCD is an electrical safety device designed to immediately switch off the supply of electricity when electricity "leaking" to earth is detected at harmful levels. RCDs offer high levels of personal protection from electric shock. While RCDs significantly reduce the risk of electric shock they do not provide protection in all circumstances.

Non portable (or "fixed") and portable RCDs
Non portable (or "fixed") RCDs are RCDs that are installed at either the switchboard or a fixed socket outlet:

1- Non portable RCDs installed at the main switchboard protect the wiring connected to the RCD and electrical equipment plugged into the protected circuit.

2- Non portable RCDs installed at a fixed socket outlet provide protection to electrical equipment plugged into the outlet.

Risk Assessment: Process of evaluating the risk arising from a hazard, taking into account the adequacy of any existing control and deciding whether or not the risk is acceptable.

Voltage:
Extra-low voltage: voltage that does not exceed 50 volts alternating current (50 V a.c.) or 120 volts ripple-free direct current (120 V ripple-free d.c.). This definition applies to all countries where Veolia operates.

Low voltage: voltage that exceeds extra-low voltage and does not exceed 1000 volts alternating current (1,000 V a.c.) or 1500 volts direct current (1,500 V d.c.) for the following countries: Australia/NZ/France/Germany/LATAM/China/UK.
For USA, Canada and all other countries, please refer to the table below.

High voltage: voltage that exceeds low voltage.

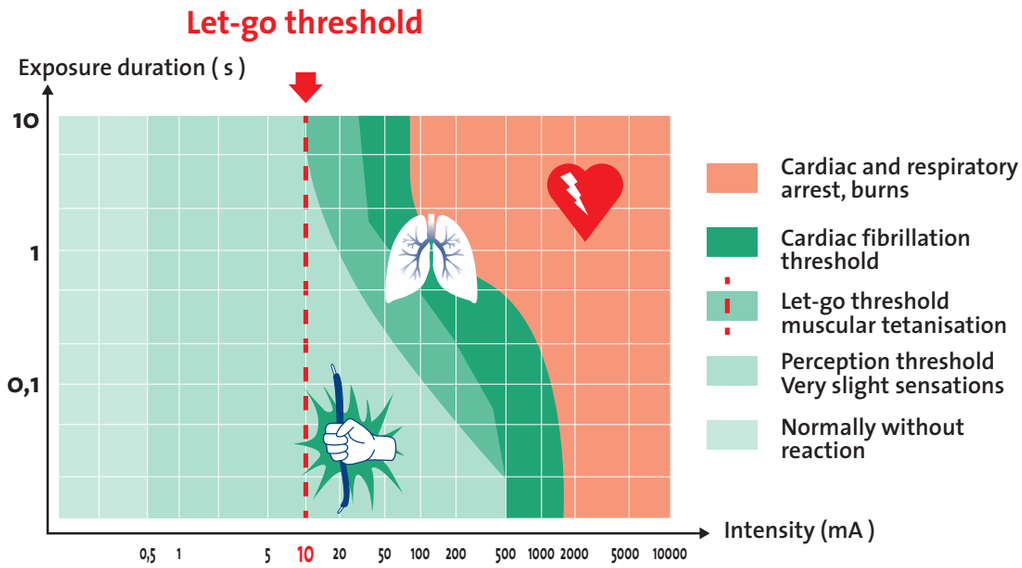
Zone	Extra-low voltage (A.C)	Low Voltage (A.C)	High Voltage (A.C)
Australia/NZ/France/Germany/ LATAM/China (International Electrotechnical Commission) UK (British Standard 7671)	<50 V	<1000 V	>1000 V
USA (National Electric Code)	<50 V	<600 V	>600 V
Canada	<50 V	<750 V	>750 V
All other countries	Refer to local definition	Refer to local definition	Refer to local

2.0 > Managing electrical risks

Main Hazards related to electricity:

Electrical shock could have the following effects:

- Burns: Tissue heating due to resistance to electricity can cause extensive and deep burns (internal and external). There is always a point of entry and an exit point.
- Electricity causes contraction of muscles. These contractions (to finger/hand muscles for instance) can prevent a victim from separation from an energized conductor. In this case, the victim is said to be "frozen on the circuit".
- Diaphragm (which is very important in lungs functioning) and heart muscles are similarly affected by electric current. This is usually lethal because it causes inefficient heart beats (fibrillation) or even respiratory stop, and/or cardiac arrest.



Threshold usually applicable for 50 Hz AC (alternative current)

Intensity (50 Hz AC)	Effects on human body – increased by contact time	Results
1 to 5 mA	Skin perception of the current	No danger
5 to 10 mA	Repulsion and risk of uncontrolled reactions	Danger
10 to 25 mA	Muscles contraction and tetanisation	Danger
25 to 30 mA	Rib cage muscles tetanisation, breathing stoppage	Danger
30 to 35 mA	Heart pace disturbances	Increased danger
500 mA = 0,5 A	Cardiac fibrillation, heart pace increases	Rapid death
1000 mA = 1 A	Heart stoppage	Immediate death

Intensity values & body effects. Real consequences depend strongly on the contact time.

Burn by arc blast

- Over 80% of all injuries and fatalities caused by electrical incidents are not due to an electric shock, but to the intense heat, light and pressure wave (blast) caused by electrical faults. The high heat produced by arc-flash, generates projections of molten metallic or plastic components which can break bones, burn severely and cause irreparably damage to internal organs (muscle necroses, thrombosis of the small vessels...).

Explosion/Fire

- Caused by electrical faults.

Fall consequent to electrical contact

- Fall from ladders, scaffolds or other work platforms for instance.

2.0.1 How to identify electrical hazards?

Hazards generated by electrical equipment or installations may arise from:

- The design, construction, installation, maintenance and testing of electrical equipment or electrical installations.
- Design change or modification.
- Inadequate or inactive electrical protection.
- Where and how electrical equipment is used.
- Electrical equipment being used in an area in which the atmosphere presents a risk for health and safety from fire or explosion, for example confined spaces.
- Type of electrical equipment. For example, "plug in" electrical equipment that may be moved around from site to site, including extension leads, are particularly liable to damage.
- The manufacturing standard for which the equipment was designed and maintenance practices.
- Work carried out on or near electrical equipment or electrical installations, including electric overhead lines or underground electric services, for example work carried out in a confined space connected to plant or services.
- Exposure to high electromagnetic fields may also present a potential hazard for workers with some medical conditions, for example pacemakers.

To identify hazards, you must:

- Talk to workers and observing where and how electrical equipment is used.
- Conduct regularly inspecting and testing electrical equipment and electrical installations as appropriate.
- Read product labels and manufacturers' instruction manuals.
- Talk to manufacturers, suppliers, industry associations, health and safety specialists.
- Review available information, including incident records (injuries and near-miss incidents related to electrical works). Information and advice about electrical hazards and risks relevant to particular industries and work activities is also available from regulators, industry associations, unions, technical specialists and safety consultants.

2.0.2 How to assess the risk?

A general risk assessment must be carried out by a competent person before working on or in the vicinity of an electrical equipment to decide what control measures are required to avoid or reduce the risk, and should be recorded.

The risk assessment must consider:

- The properties of electricity.
- How and where the electrical work is carried out.
- The competence of the persons carrying out the electrical work.

The following risk factors associated with carrying out electrical work must be considered:

- The people – physically fit for the work.
- Competence of people carrying out the work, noting that licensing requirements may apply for the electrical work under local electrical safety laws.
- Training: workers' experience, capabilities and skills.
- The activity: nature of the electrical work to be carried out.
- Sources of electrical risks, including energy levels at the workplace.
- Potential or actual high-fault current levels (i.e. risks associated with arc flash).
- Availability of isolation points.
- Work practices.
- Location, type of plant.
- Consequences of loss of energy supply (impact on people, service disruption, etc.).
- Availability of up-to-date electrical diagrams for the installation.
- The equipment and machinery to be used.
- Misoperation of batteries: sparks, hydrogen gas explosion, acids projection.
- The Testing: availability of suitable test instruments.
- The PPE: availability of properly rated PPE.
- The environment, the workplace and working environment, for example:
  - Corrosive atmosphere (H_2S, NH_3, moisture, etc.).
  - In and around trenches, pits and underground ducts.
  - Ladders, scaffolds, portable pole platforms, elevating work platforms, poles and towers.
  - Confined spaces (refer to Confined Space Standard).
  - Ability to safely rescue persons.

2.0.3 Risk management - Hierarchy of control

Once hazards have been identified and the risks assessed, appropriate control measures must be set.

Control measures should be ranked from the highest level of protection and reliability to the lowest. This ranking is known as the **HIERARCHY OF CONTROL** or RISK MANAGEMENT HIERARCHY.

You must always aim to **eliminate a hazard** which is the most effective control. If it is not reasonably practicable, the risk should be minimized by one or a combination of the following:

HIGHEST	**ELIMINATION**	**Can electrical risks be totally eliminated?** Can the work be done another way?	**MOST**
Health and Safety Protection ↕	**SUBSTITUTION**	**Can electrical works or works nearby electrical equipment be replaced for a less hazardous method, material or system?** For example: use of extra-low voltage electrical equipment such as a battery-operated tool rather than a tool that is plugged into main electricity.	Reliability of control measures ↕
	ENGINEERING	**Can engineering control measures be used to minimise the risk?** For example: installing residual current devices to reduce the risk of receiving a fatal electric shock.	
	ISOLATION	**Can workers be prevented from coming into contact with the source of an electrical hazard?** For example: lock-out/tag-out; enclosed cabinet.	
	ADMINISTRATIVE CONTROLS	**Can training, increased supervision, procedures and signage minimize exposure?** Administrative controls involve the use of safe work practices to control the risk, for example establishing exclusion zones, use of permits and warning signs.	
LOWEST	**PERSONAL PROTECTIVE EQUIPMENT**	**Can PPE protect the workers from the hazard or risk?** PPE includes protective eyewear, insulated gloves, hard hats. Most forms of PPE are not relevant to minimising electrical risks in workplaces, except in relation to energised electrical work.	**LEAST**

You must check that your chosen control measure does not introduce new hazards. You must ensure that the control measures you implement remain effective. This includes checking that the control measures are fit for purpose, suitable for the nature and duration of the work, are installed and used correctly.

2.0.4 Reviewing Risk Assessment

You must review and as necessary conduct a new risk assessment in the following circumstances:

- When the control measure does not control anymore the risk it was implemented to control so far.
- If there is a change in work practices or process (MOC).
- If an electrical incident or near-miss occurred.
- If the results of consultation indicate that a review is necessary.
- If the supervisor or relevant stakeholders request a review.

3.0 > Requirements

Application

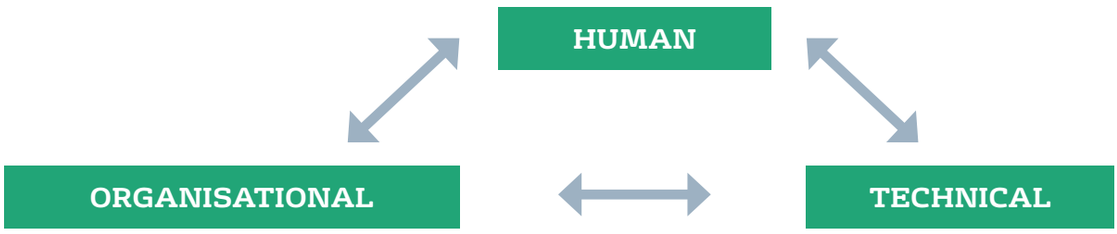
This High-Risk Management Standard applies to all electrical works and works in the vicinity of electrical equipment.

This Standard applies to all Veolia business undertakings and operations involving employees, contractors, visitors or any other person. This Standard applies in addition to requirements prescribed by prevailing legislation, Codes of Practice, ISO and the manufacturer's safety recommendation.

Requirements

Use of the word **"must"** within this Protocol means a requirement is mandatory.

Use of the word **"should"** within this Protocol means the primary intent is that the requirement is mandatory, but specific circumstances may mean implementation of the requirement is not reasonably practicable.



3.0.1 – General requirements

> 3.0.1.1 – Work with electrical tools, and/or nearby electrical equipment, and/or in electrical cabinets/rooms

Human

1. Electrical equipment must only be operated by persons who have received the necessary training and have been recognized competent in accordance with any training and competency requirements identified in the risk assessment process. This includes electrical equipment provided by Veolia for use by customers on the customer's premises, such as waste compactors and bin lifters.
2. Equipment-specific training and competency assessment may not be necessary where the operation of the equipment has been assessed as not presenting a significant risk of harm to any person. This is likely to include equipment such as computers, kitchen appliances and other domestic items.
3. Since metal objects worn on or close to the body increase the risk of electric shock, you must remove all rings, key chains or other metal objects such as watches and watchbands when working around electricity. Furthermore, you must remove any jewellery and/or metallic objects that may be stored in your pockets.
4. Prior to use, a visual pre-use inspection of all tools, instruments and equipment to satisfy themselves of its condition and suitability for purpose must be undertaken by a competent person. If any doubt exists that tools and equipment might not be adequate they must be removed.
5. You must avoid unrestrained tools to fall into energised switchboards and compromise the integrity (including safety) of the equipment by using lanyards around wrists, tool holders and restraints such as tool pouches and baskets.
6. You must use special design characteristic (i.e. insulated) tools, instruments and equipment.
7. You must visually inspect insulated covers and mats for possible defects before and after each use.

Organisational

1. Access to electrical switchboards, cabinets and enclosures containing exposed live parts is restricted to licensed electrical workers. All such switchboards, cabinets and enclosures must be locked or otherwise secured to prevent unauthorised entry or to prevent any work that could be done without meeting the applicable safety distances from live parts.
2. Access to electrical control rooms, substations and similar areas must be restricted to authorised and appropriately qualified persons. Access to these areas must be controlled by key lock or other security measures to prevent unauthorised entry or to prevent any work that could be done without meeting the applicable safety distances from live parts.
3. Access points to such areas must be identified with an electrical hazard warning notice in accordance with the relevant local applicable standards.
4. Any work near live parts must be performed outside from a safe distance (called "prohibited approach boundary") which must never be crossed, in order not to be affected by the effects of an arc flash/blast
5. In order to work de-energised on electrical equipment or circuits, an authorised and competent person must effectively isolate electrical equipment/circuits from all relevant sources of electricity supply

following requirements of the Veolia LOTO Standard, including following steps:

- Before electrical work is carried out on electrical equipment, the equipment must be tested by an authorised and competent person to determine whether or not it is energised. Each exposed part must be treated as energised until it is isolated and determined not to be energised; and each high-voltage exposed part must be earthed after being de-energised.
- **The safe work principle "TEST FOR 'DEAD' BEFORE YOU TOUCH" must be applied all times:** Even if the electricity supply is believed to have been isolated, it must be assumed that all conductors and electrical components are energised until they have been proven de-energised. The testing method must be safe and effective. The electrical worker carrying out the testing must understand testing procedures and be competent in the use of the tester.

  Panel voltmeters should not be used as the only method of determining whether an electrical part is de-energised.
- If voltage testers are used they should be tested for correct operation immediately before use and again after use to confirm that the instrument is still working. This check should be considered to be part of the "TEST FOR 'DEAD' BEFORE YOU TOUCH" safe work principle.

6. Tools, instruments and equipment must be properly maintained, appropriately used and fit for purpose.
7. All portable electrical equipment, appliances and tools must be visually checked by the user for damage and to verify the test tag (where required) is current before each use. Electrical equipment, appliances and tools that are faulty, damaged or do not have a current test tag must be immediately taken out of service identified with an "Out of Service" tag and placed in a designated holding area.
8. Insulated tools and equipment must be suitable for the work and be maintained in good working order, including by regular maintenance, inspection and testing.
9. Maintenance and inspection must be carried out according to manufacturer's instructions.
10. Prohibit the use of metallic, wire reinforced or otherwise conductive ladders.
11. Ensure that an adequate number of workers are trained to administer first aid at the workplace.
12. An emergency written rescue and emergency plan must be established and validated before any intervention and communicated to all involved. Unauthorised, unequipped people must not attempt to rescue a person receiving an electric shock. Secondary deaths often occur because others get electrocuted trying to help earlier victims.
13. All electrical-related incidents that occur on a Veolia work site or in relation to Veolia activities in any location must be reported, recorded and investigated in accordance with Veolia serious injury accident procedure. In addition to Veolia incident reporting requirements, electricity-related incidents may also be notifiable under local legislation. The Director of Business Unit, in conjunction with operations management is responsible for ensuring all electrical incidents are assessed to determine if they are notifiable and for ensuring that the required notification occurs. The reporting of notifiable incidents to the appropriate authority(ies) must be carried out only by the authorised persons within business unit.

Technical

1. If there are any exposed conductors in the immediate work area they should be separated by design or segregated and protected with insulated barricades, insulated shrouding or insulated material to prevent against inadvertent or direct contact.

2. The use of extension leads must be kept to a minimum. Where they are used, they are to be protected from damage and must not be left in any position that could present a hazard to any person. Leads should not cross access ways unless secured or covered to minimise trip hazards.
3. Leads must be fully uncoiled before use to prevent overheating. The use of multi-outlet power boards must be kept to a minimum. Where they are used, they must be fitted with an overload protection device or combined overload/RCD device.
4. Double adaptors and piggyback plugs must not be used in any Veolia workplace due to the risk of overloading and potential fire hazard they present.
5. All portable Mains Voltage electrical equipment that is used outside, in damp conditions or in hostile environments (high-risk of damage) must be protected with an RCD, either permanently installed as part of the building electrical installation, or of a portable type fitted at the socket outlet.
6. Veolia semi-portable electrical equipment, such as waste compactors and bin lifters, which is permanently located on customer premises, must be protected with a permanently installed RCD. Equipment supplied on a temporary basis may be protected with a portable RCD fitted at the socket outlet.
7. Portable generators and power inverters used to provide electricity for electrical equipment must be fitted with a fixed or portable RCD at the socket outlet.
8. In certain situations electric arc welders can present a risk of fatal electric shock. To minimise this risk, electric arc welders must be fitted with a risk control measure such as a voltage-reducing device or hand piece trigger switch in accordance.

> 3.0.1.2 – Personal Protective Equipment (PPE)

1. Personal Protective Equipment (PPE) must be selected depending on the type of electrical testing work and the risks involved such as:
   - Face Protection—use of a suitably arc rated full-face shield may be appropriate when working where there is potential for high current and arcing.
   - Eye Protection—metal frames must not be worn.
   - Gloves—use gloves insulated to the highest potential voltage expected for the work being undertaken. Leather work gloves may be considered for de-energised electrical work.
   - Clothing—use non synthetic clothing of non fusible material and flame resistant.
   - Clothing made from conductive material or containing metal threads must not be worn.
   - Footwear—use non conductive footwear, for example steel toe-capped boots or shoes manufactured to a suitable standard.

Human

1. The employer must provide training to each employee who is required to use PPE in order to be able to know when and what PPE is necessary; how to properly adjust and wear PPE; the limitations of the PPE; and the proper care, maintenance, useful life and disposal of the PPE. A record of training must be kept.

2. The employee must demonstrate an understanding of the training and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

Organisational

3. You must maintained PPE in a safe, reliable condition and periodically inspect or test them.

4. You must store insulating equipment in a way that does not damage the material. The following items can cause damage: extremes temperature, UV damage, excessive humidity, ozone (UV rays, arcing), foreign materials (oils, petroleum products, hand lotion, baby powder).

5. You must inspect insulating equipment for damage before each days use and anytime damage is suspected. Typical damage to insulating equipment might include the following: embedded foreign objects (metal slivers, splinters), holes, punctures, tears or cuts, ozone damage (fine cracks), swelling, softening, sticky or hardening, damage from chemicals.

6. Before each days use, you must conduct an air testing on insulated gloves. To conduct the test, fill the glove with air and hold against your cheek to feel for and hear releasing air.

7. You must conduct periodic electrical tests on Electrical Protective Equipment to ensure its protective qualities are still present.

Protective Equipment Testing Schedule	
Equipment	When to test
Gloves	Before first issue and every six months after that*
Blanket/Sleeves	Before first issue and 12 months after that.
Line Hose/Covers	Upon indication that insulating value is devalued.

Figure P-1
*** If the protective equipment has been electrically tested, but not issued for use, it may not be put into service unless it has been electrically tested within the previous 12 months.**

Technical

PPE for the Head

1. You must wear non conductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.

   There are 2 different types and 3 different classes:

   - Type I helmets offer protection from blows to the top of the head.

   - Type II helmets offer protection from blows to both the top and sides of the head.

   - Class G (General) helmets reduce the force of impact of falling objects and also reduce the danger of contact with exposed low-voltage electrical conductors. Helmet shells are proof-tested at 2,200 volts of electrical charge.

   - Class E (Electrical) helmets reduce the force of impact of falling objects and also reduce the danger of contact with exposed high-voltage electrical conductors. Helmet shells are proof-tested at 20,000 volts.

   - Class C (Conductive) helmets reduce the force of impact of falling objects, but offer no electrical protection.

PPE for the Eyes & Face

2. You must wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

3. When working on energized parts, the possibility of arc flash exists and the employee must be protected. Dangers could include heat, flying hazards and molten metal, therefore the PPE must be durable, non conductive, heat resistant and provide deflection qualities.

PPE for the Body (Flame Resistant [FR] Clothing)

4. When working in areas where there are potential electrical hazards you must be provided with, and must use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed. This clothing must be flame resistant. FR clothing can take the form of pants, shirts, coveralls, jackets, parkas and full flash suits. Obviously, fit, comfort and flexibility are important but the greatest indicator of adequate FR clothing for a given task is based on the "arc thermal performance value" (ATPV). The ATPV is incident energy on a material that results in sufficient heat transfer through the fabric or material to cause the onset of a second degree burn. Manufacturers of FR clothing will provide an ATPV rating on their clothing and you must match the ATPV with the potential exposures in the workplace.

5. When inspecting and maintaining FR clothing, you must always follow the manufactures recommendations. FR clothing must be visually inspected before each use; however additionally inspections during the work day may be necessary. FR clothing that becomes contaminated with grease, flammable liquids etc. must be removed and sent to be laundered.

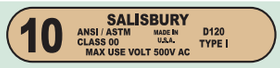
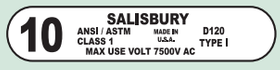
PPE for the Hands (Gloves)

6. You must use effective insulating gloves with high-insulating qualities, while also being comfortable, durable and flexible. There are 2 types of insulating gloves:

   - Type I glove is not ozone resistant. Ozone is a form of oxygen that is found in the air surrounding a conductor in high voltages. It can causes dangerous cracks to form in rubber products, including insulating gloves, thus rendering them unsafe. Type I rubber gloves can also be negatively affected by UV light so care should be taken to properly store and inspect these gloves.

   - Type II is ozone resistant. The Type II gloves are not as susceptible to ozone and UV rays, however they are not as flexible as Type I and therefore more uncomfortable to wear.

   There are 6 classifications of protective gloves, each based on the approved voltage levels the gloves can provide protection for. It's quite easy to determine the classification based on a color-coded tag found on the glove.

Voltage Classifications for Rubber Gloves				
Tag Colour	**Class**	**Proof Test Voltage AC/DC**	**Max. Usage Voltage AC/DC**	**Glove Tag**
Beige	00	2,500/10,000	500/750	
Red	0	5,000/20,000	1,000/1,500	
White	1	10,000/40,000	7,500/11,250	
Yellow	2	20,000/50,000	17,000/25,500	
Green	3	30,000/60,000	26,500/39,750	
Orange	4	40,000/70,000	36,000/54,000	

7. Leather protective gloves must always be worn over rubber insulating gloves to provide the needed mechanical protection against cuts, abrasion and punctures.

Other Protective Equipment (determined by a risk assessment):

8. Protective shields, protective barriers, or insulating materials must be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur.

9. The Arc Suppression Blanket is used as a barrier for protection from the explosive and incendiary effects of electrical arcs and flashes. The blanket can be used for worker protection in underground vaults, switchyards, and other locations where electrical equipment poses a risk of exposure to explosive electrical discharges.
NOT an Electrically Insulating Blanket.

> 3.0.1.3 – Inspecting & Testing

Human

1. You must ensure that the electrical equipment is regularly inspected and tested by a competent person.

Organisational

1. You must develop a procedure to manage regular inspections and testing of electrical equipment looking for obvious damage, defects or modifications to the electrical equipment, including accessories, connectors, plugs, cord extension sockets, flexible cords etc. This procedure must also check integrity of protective earth and insulation resistance.
2. You must ensure that any unsafe electrical equipment at the workplace is locked-out / tagged-out (please refer to LOTO High-Risk Management Standard) then disconnected from its electricity supply. It must not be reconnected until it is repaired or tested and found to be safe or is replaced or permanently removed from use.
3. You must visually inspect new electrical equipment to ensure that no damage occurred during transport, delivery, installation or commissioning. You must tag new electric equipment with date of the first electrical test according to manufacturer's recommendations, date of next electrical safety test is due and the manufacturer's certificate of compliance. You must update electrical drawings of installation to include new equipment. You must ensure that the electrical equipment is then regularly inspected and tested by a competent person.
4. You must test this equipment at least once every 12 months. More frequent testing may be required, for example in relation to:
   - Electrical equipment used in manufacturing and workshop environments (e.g. at least once every 6 months).
   - Commercial cleaning equipment (e.g. at least once every 6 months).
   - Hire equipment (e.g. at least once every 3 months). Hiring out electrical equipment must be inspected at the commencement of each hire and tested every 3 months.
   - Construction or demolition sites (please refer to local law).
5. You must keep a record of testing until the electrical equipment is next tested, permanently removed from the workplace or disposed of. A record of testing (log book, database, register or similar) must specify the following: name of person who carried out the testing, date of the testing, outcome of the testing and date on which the next testing must be carried out. The record may be in the form of a tag attached to the electrical equipment tested. If the record of testing is a tag, it should be durable, water resistant, non metallic, self-adhesive or well-secured, incapable of re-use and have a bright, distinctive surface.
6. All portable electrical appliances, tools and extension leads that are required to be tested and tagged must be recorded on a register. The register must detail the make, model, unique reference number, location, test frequency, test date, test results and other pertinent information.

Technical

1. Test instruments must meet the following conditions:
   - Be suitable for the work in terms of their function, operating range and accuracy.
   - Be in a good condition and working order, clean and have no cracked or broken insulation. Particular care must

be taken regarding the condition of the insulation on leads, probes and clips of test equipment.

- Pose no danger of electrocution to workers or damage to the electrical equipment during testing
- Have suitably insulated leads and connection probes that enable connection or contact with energised parts to be made with minimal risk to the electrical worker.
- Provide suitable protection against hazards arising from over-voltages that may arise from or during the testing or measurement process.

2. Test probes and other equipment must be designed and selected so that they cannot inadvertently short circuit between live conductors or live conductors and earth. The terminals of test equipment must be shrouded and all other test sockets on measuring instruments must be designed so as to prevent inadvertent contact with any live test socket or conductor when equipment is in use. Where appropriate, test leads and testing devices need to be provided with suitable fuse protection. Testing equipment, where used in hazardous flammable areas, must be designed and clearly marked as being suitable for use in these conditions.
3. Equipment used for detecting an energised source must be trialled, immediately before and after the testing, to ensure that it is functioning correctly.
4. To confirm a positive indication and to establish the circuit voltage, you must use an alternative test instrument that incorporates a visual display before commencing electrical work on the equipment.
5. Testers for detecting an electric field surrounding an energised conductor may not be suitable for testing cables that are surrounded by a metallic screen, enclosed in a metallic pipe or duct, or cables carrying direct current and in some other circumstances.

> 3.0.1.4 – Residual Current devices (RCDs)

Human

1. You must ensure that RCDs used at the workplace are tested regularly by a competent person to ensure the devices are working effectively.

Organisational

1. A record of testing must be kept until the device is next tested or disposed of. New RCDs must be also tested to ensure they are effective.

Technical

1. You must ensure that any electrical risk associated with the supply of electricity to "plug in" electrical equipment is minimised by the use of an appropriate RCD. If electricity is supplied to the equipment requiring an RCD through a socket outlet not exceeding 20 amps the RCD must have a tripping current that does not exceed 30 milliamps.
2. This does not apply if the supply of electricity to the electrical equipment:
   - Is extra-low voltage (alternating current), or
   - Is direct current, or
   - Is provided through an isolating transformer that provides at least an equivalent level of protection, or

- Is provided from a non earthed socket outlet supplied by an isolated winding portable generator that provides at least an equivalent level of protection.

3. You must ensure that RCDs used at the workplace are selected according to your workplace environment.

3.0.2 – Requirements for high voltage electrical work

Requirements for electrical work on high voltage equipment after switching and applying LOTO (refer to LOTO Standard) are specialised requirements. High voltage switching (e.g. substations and power generation stations) must only be carried out by trained, competent and authorised persons in accordance with an approved, documented switching plan or procedure, in compliance with local electrical safety regulations.

Human

1. Only competent electrical workers who have received appropriate training in high voltage electrical work are permitted to work on high-voltage electrical equipment. For more information you must seek further advice about working on or near high-voltage electrical installations from a specialist electrical contractor or the local electricity supply authority.

Organisational

1. Persons conducting a business or undertaking who have a high voltage electrical installation must prepare an Installation Safety Management Plan for their workplace. The plan must address the risks associated with the operation and maintenance of the high voltage installation. This may include:
   - A single line diagram for the installation, showing all switches and circuit breakers and their identifying labels or numbers.
   - Site-specific operating rules covering all aspects of operating the high voltage installation, including procedures for arranging isolation of the installation from the local electricity network.
   - Procedures for identifying hazardous areas including any confined spaces associated with the installation.
   - Competency requirements for persons who may be permitted to operate or work on the high voltage installation, including appropriate requirements for re-training, re-testing and re-accreditation.
   - Induction procedures for contractors.
   - Regular inspection and maintenance programs to ensure the installation remains serviceable and safe.
   - Procedures for ensuring there is no extension or alteration of the installation without permission from the local electricity supply authority.
   - Procedures for the safe handling of insulating oils and other substances that may be required for maintenance or repair.
   - Procedures including warning signs for ensuring that all parts of the high voltage installation (e.g. underground cables and high voltage overhead power lines) are not damaged by heavy vehicles or other mobile plant, for example mobile cranes.

3.0.3 – Requirements for works near or underneath overhead electric lines

A number of operations undertaken by Veolia have the potential to position plant, equipment or people in the vicinity of live overhead power lines, underground cables or other live electrical parts. These operations are likely to include: waste collection; drain cleaning; water blasting; painting; scaffolding, excavating, drilling and similar activities.

Contact with live overhead lines is extremely dangerous and can result in fatal electric shock, equipment damage and fire. In the case of high voltage lines, direct contact with the lines is not necessary for electric shock to occur. The electricity can jump a considerable distance and flow to the ground through equipment and people near to the line.

> 3.0.3.1 – Service Lines on Customer Properties

Organisational

1. In the case of overhead service lines on customer premises, a site risk assessment must be conducted prior to commencement of the service taking into account the movement of plant, equipment and materials during the job in order to assess the risk of conflict between the overhead lines and the work activities. Then a decision on the approach distance for the proposed work can be made by a local electrical supply authority. Where it is not possible to ensure a safe distance, additional control measures that are consistent with the requirements of the Electricity Supply Authority must be applied.

> 3.0.3.2 – Overhead Lines on Veolia Properties

Organisational

1. Where overhead lines exist on a permanent Veolia site, a risk assessment must be carried out and the appropriate hazard controls established. These controls should include:
   - Warning signs erected either side of the overhead lines, particularly on any road or access way that passes under or alongside the overhead lines.
   - Visual indicators such as flag markers, balls or shrouds fitted to the lines.
   - Installation of height limit barriers.
   - Barriers constructed at ground level that prevent vehicle/plant access under the lines, and
   - Safe work procedures and associated training programs developed and implemented.

> 3.0.3.3 – Vehicle Operations in the Vicinity of Overhead Lines

1. You are not authorised to work under them when equipment (e.g. ladders, a crane jib, a tipper-lorry body or a scaffold pole) could come within a minimum approach distance. Figure 1 shows the distances that must be assessed for each site.
2. There are three work zones:
   - Zone C is a no go zone closest to and surrounding the electric line where authority from the Electricity Supply Authority is required.
   - Zone B surrounds the electric line and is further away than Zone C. It is for authorised persons appointed by the Electricity Supply Authority.
   - Zone A is furthest away from the electric line and is for unauthorised persons.

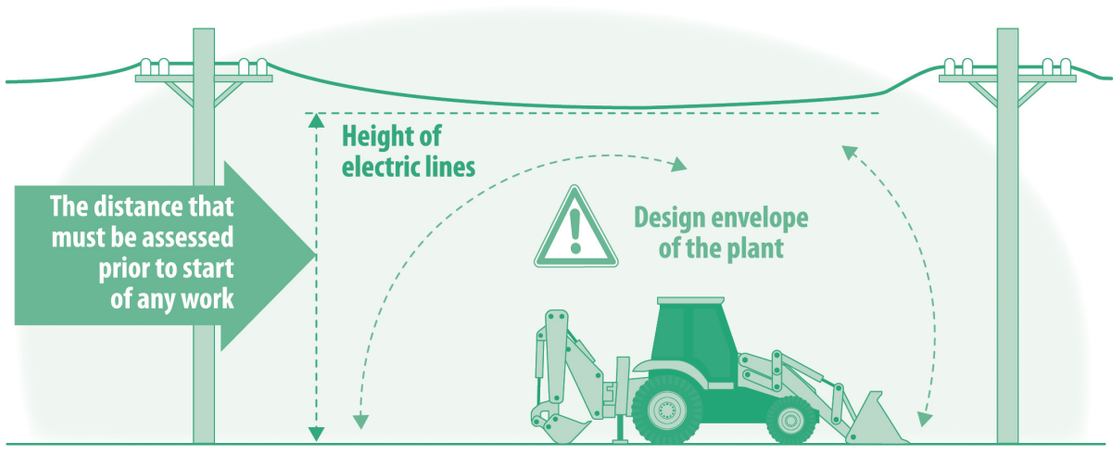


FIGURE 1 Distance that must be assessed for each site.

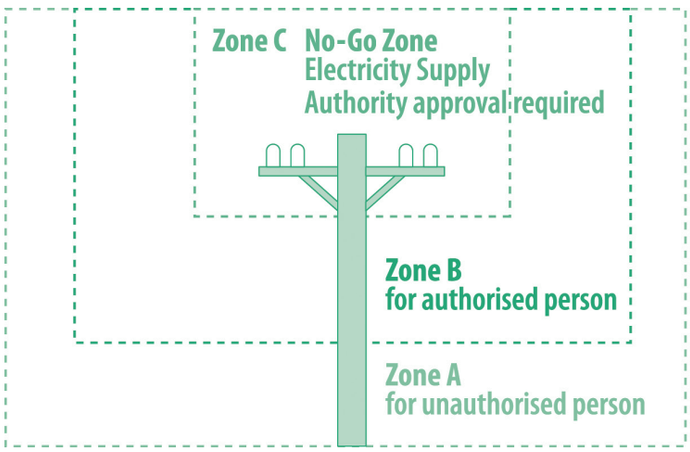


FIG 2 Work zones in the vicinity of overhead electric line poles.

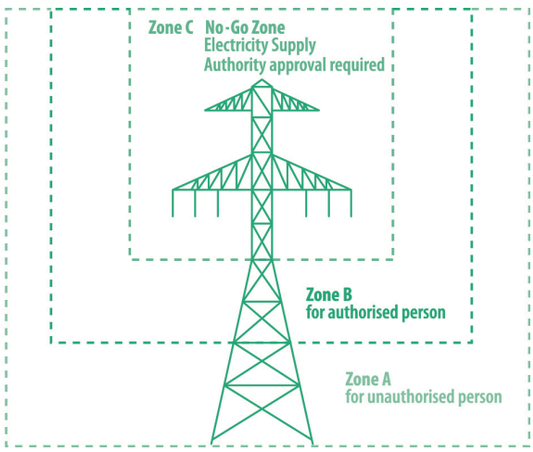


FIG 3 Work zones in the vicinity of overhead electric line tower site.

Human

1. Zone A: Unauthorised persons

Unauthorised workers can only work in Zone A. Unauthorised persons are workers who have not received training in overhead line electrical hazards and do not have sufficient training or experience to enable them to avoid the dangers from overhead electric lines and associated electrical equipment.

Zone A applies to:
unauthorised persons performing work in the vicinity of overhead electric lines including plant, hand tools, equipment or other material held by them, and cranes and their loads and mobile plant operated by an unauthorised person in the vicinity of overhead electric lines.

Use a risk assessment to decide whether a safety observer is necessary. The safety observer should monitor work close to Zone B to ensure no workers, plant or equipment enters Zone B. Safety observers who observe the work in Zone B must have successfully completed a relevant training course provided by a registered training organisation. Safety observers must be competent to implement control measures in an emergency and to rescue and resuscitate the worker who is carrying out the work, if necessary. A safety observer must have been assessed in the previous 12 months as competent to rescue and resuscitate a person. Safety observers should be re-assessed annually to ensure their on-going competency to work in the vicinity of overhead electric lines.

2. Zone B: Authorised persons

Authorised persons are workers who have successfully completed a recognised training course in overhead line electrical hazards, and appointed by the Electricity Supply Authority, so are permitted to work in Zone B.

3. Zone C: No Go Zone – requires Electricity Supply Authority approval

Zone C is the no go zone around overhead electric lines and associated electrical equipment where no part of a person, material, crane, vehicle or mobile plant may enter while the electric lines and associated electrical equipment are energised, without written approval from the Electricity Supply Authority. Work in this zone is prohibited.

Organisational

1. Before starting work, you must rely on a local electrical supply authority to assess the safe approach distances.
2. Approach distances can apply to all:
   - Parts of a crane or mobile plant including vehicles.
   - Loads being moved including waste bin, slings, chains and other lifting gear.
   - People working at heights e.g. from an elevating work platform, scaffold or other structure.
   - Hand tools, hand control lines, equipment or other material held by a person.

A decision on the approach distance for the proposed work can be made once an assessment of the site and the overhead electric lines has been done. Where it is not possible to ensure a safe distance, you must carry out a risk assessment for the proposed work and define control measures that are consistent with the risk assessment and the requirements of the Electricity Supply Authority.

3.0.4 – Requirements for works near underground electric lines

Working in the vicinity of underground electric lines or cables may involve potential contact with exposed energised parts (please refer to the Excavation and Trenching Standard for further advice). For example:

1. A plumber cutting a conductive water pipe that is part of the site's electrical installation's earthing system.
2. A fencing contractor digging holes or driving posts where an electrical cable could be buried.
3. Digging holes with metal hand tools e.g. spades, shovels, picks, forks and hammers.
4. Driving implements into the ground e.g. star pickets where underground services may be located.
5. A worker digging a trench to locate underground pipes.
6. Excavating trenches with earth moving machinery using a metal toothed bucket, and
7. Using mobile cranes or heavy vehicles that become bogged.

Always assume cables will be present when digging in the street, pavement and/or near buildings.

Organisational

1. Before starting work and whether at a construction site or not, you must find out from relevant sources what underground electrical cables could create a risk if contacted or damaged. Use this information to plan the work and keep a written record of this information on site.
   - If excavating in a public place you must identify all electrical cables present. Contact relevant authorities about all cables they may have placed in the vicinity of the excavation: electricity supply authorities, communication companies, local government authorities, and water authorities.
   - If excavating on private property, contact the owner or occupier of the premises about buried cables before starting work.
2. Then you must carry out a written risk assessment that must be available on site for the duration of the work. Risk assessment must consider tools damaging cables or equipment (e.g. when digging, driving equipment or excavating where buried electrical cables may be present) and electric cables or equipment being concealed in a work location. If it is not known whether cables, conduits, equipment or situations form an electrical safety risk, you must assume the risk exists or you must have a qualified person investigate and provide a report.
3. If you cannot determine exactly where an underground cable is, you should use pot-holing to carefully identify the cable location and avoid accidental contact with the cable. Pot-holing involves carefully digging with hand tools to a pre-determined depth to verify if assets exist in the immediate location. You must use insulated hand digging tools suitable for the voltage concerned or use vacuum pumping in the pot-holing process to locate the underground cable.
4. Where the risk is known, for example where an electrical conduit contains an energised low voltage circuit and there is a risk the conduit could be cut or scraped with a power tool, suitable control measures must be used. This may include having the electricity supply to the site isolated (please refer to the Veolia LOTO Standard). Sometimes when many cables are co-located identifying the isolation point for a particular cable is not easy. A competent and authorised person

must be engaged to do the isolation work or it must be necessary to have the Electricity Supply Authority disconnect the supply. De-energising electric lines must be arranged as soon as possible.

5. If it is not possible to eliminate the risk then the remaining risk can be minimised by applying the hierarchy of controls.

3.0.5 – Emergency plan for works in the vicinity of overhead or underground electric lines

Planning work in the vicinity of overhead or underground electric lines should include possible emergency situations and the rescue and evacuation of workers.

Human

1. Workers working in the vicinity of overhead electric lines or underground electric lines must be trained on the emergency plan measures applicable to their activity.
2. Only authorised and equipped people must attempt to rescue a person receiving an electric shock. Secondary deaths often occur because others get electrocuted trying to help earlier victims.

Organisational

1. You must ensure an emergency plan is prepared and maintained so it is effective for each workplace or site. This is especially critical for work sites at remote locations. A risk assessment should be done covering potential emergency situations resulting from mobile plant or attached equipment contacting energised electric lines including:
   - Contact with energised electric lines when the electricity trips.
   - Contact with the energised electric lines when the electricity does not trip.
   - A fire starting on the mobile plant or attached equipment.
   - A grass or bushfire starting.
   - A tyre catching fire or tyre pyrolysis leading to a tyre explosion, or a combination of any of the above.
2. An emergency plan should be developed from the results of the risk assessment, consulting with workers, the Electricity Supply Authority or the person with management or control of the electric line or premises and emergency service providers.
3. The emergency plan must be reviewed and tested at least annually or after any significant change is done to its content.
4. When a crane, mobile plant or heavy vehicles has been in contact with an energised overhead electric line, it must be checked by a competent person for damage to the components of the equipment. All recommended actions are to be completed before equipment is returned to service.

3.0.6 – Lightning protection

Organisational

- Each site must carry out a lightning study and comply with the recommendations resulting from it. This lightning study must be realized by a certified and competent body.

APPENDIX 1 › Applicability and compliance assessment

› 3.0.1 GENERAL REQUIREMENTS	C	NC
› 3.0.1.1 Work with electrical tools, and/or nearby electrical equipment, and/or in electrical cabinets/rooms		
HUMAN		
1. Electrical equipment must only be operated by persons who have received the necessary training and have been recognized competent in accordance with any training and competency requirements identified in the risk assessment process. This includes electrical equipment provided by Veolia for use by customers on the customer's premises, such as waste compactors and bin lifters.		
2. Equipment-specific training and competency assessment may not be necessary where the operation of the equipment has been assessed as not presenting a significant risk of harm to any person. This is likely to include equipment such as computers, kitchen appliances and other domestic items.		
3. You must remove all rings, key chains or other metal objects such as watches and watchbands when working around electricity. Furthermore, you must remove any jewellery and/or metallic objects that may be stored in your pockets.		
4. Prior to use, a visual pre-use inspection of all tools, instruments and equipment to satisfy themselves of its condition and suitability for purpose must be undertaken by a competent person. If any doubt exists that tools and equipment might not be adequate they must be removed.		
5. You must avoid unrestrained tools to fall into energised switchboards and compromise the integrity (including safety) of the equipment by using lanyards around wrists, tool holders and restraints such as tool pouches and baskets.		
6. You must use special design characteristic (i.e. insulated) tools, instruments and equipment.		
7. You must visually inspect insulated covers and mats for possible defects before and after each use		
ORGANISATIONAL		
1. Access to electrical switchboards, cabinets and enclosures containing exposed live parts is restricted to licensed electrical workers. All such switchboards, cabinets and enclosures must be locked or otherwise secured to prevent unauthorised entry or to prevent any work that could be done without meeting the applicable safety distances from live parts.		
2. Access to electrical control rooms, substations and similar areas must be restricted to authorised and appropriately qualified persons. Access to these areas must be controlled by key lock or other security measures to prevent unauthorised entry or to prevent any work that could be done without meeting the applicable safety distances from live parts.		
3. Access points to such areas must be identified with an electrical hazard warning notice in accordance with the relevant local applicable standards.		
4. Any work near live parts must be performed outside from a safe distance (called "prohibited approach boundary") which must never be crossed, in order not to be affected by the effects of an arc flash/blast.		

5. In order to work de-energised on electrical equipment or circuits, an authorised and competent person must effectively isolate electrical equipment/circuits from all relevant sources of electricity supply following requirements of the Veolia LOTO Standard, including following steps: • Before electrical work is carried out on electrical equipment, the equipment must be tested by an authorised and competent person to determine whether or not it is energised. Each exposed part must be treated as energised until it is isolated and determined not to be energised; and each high-voltage exposed part must be earthed after being de-energised. • The safe work principle "'TEST FOR 'DEAD' BEFORE YOU TOUCH" must be applied at all times: Even if the electricity supply is believed to have been isolated, it must be assumed that all conductors and electrical components are energised until they have been proven de-energised. The testing method must be safe and effective. The electrical worker carrying out the testing must understand testing procedures and be competent in the use of the tester. • Panel voltmeters should not be used as the only method of determining whether an electrical part is de-energised. • If voltage testers are used they should be tested for correct operation immediately before use and again after use to confirm that the instrument is still working. This check should be considered to be part of the "TEST FOR 'DEAD' BEFORE YOU TOUCH" safe work principle.		
6. Tools, instruments and equipment must be properly maintained, appropriately used and fit for purpose.		
7. All portable electrical equipment, appliances and tools must be visually checked by the user for damage and to verify the test tag (where required) is current before each use. Electrical equipment, appliances and tools that are faulty, damaged or do not have a current test tag must be immediately taken out of service identified with an "Out of Service" tag and placed in a designated holding area.		
8. Insulated tools and equipment must be suitable for the work and be maintained in good working order, including by regular maintenance, inspection and testing.		
9. Maintenance and inspection must be carried out according to manufacturer's instructions.		
10. Prohibit the use of metallic, wire reinforced or otherwise conductive ladders.		
11. Ensure that an adequate number of workers are trained to administer first aid at the workplace.		
12. An emergency written rescue and emergency plan must be established and validated before any intervention and communicated to all involved. Unauthorised, unequipped people must not attempt to rescue a person receiving an electric shock. Secondary deaths often occur because others get electrocuted trying to help earlier victims.		
13. All electrical-related incidents that occur on a Veolia work site or in relation to Veolia activities in any location must be reported, recorded and investigated in accordance with Veolia serious injury accident procedure. In addition to Veolia incident reporting requirements, electricity-related incidents may also be notifiable under local legislation. The Director of Business Unit, in conjunction with operations management is responsible for ensuring all electrical incidents are assessed to determine if they are notifiable and for ensuring that the required notification occurs. The reporting of notifiable incidents to the appropriate authority(s) must be carried out only by the authorised persons within business unit.		
TECHNICAL		
1. If there are any exposed conductors in the immediate work area they should be separated by design or segregated and protected with insulated barricades, insulated shrouding or insulated material to prevent against inadvertent or direct contact.		
2. The use of extension leads must be kept to a minimum. Where they are used, they are to be protected from damage and must not be left in any position that could present a hazard to any person. Leads should not cross access ways unless secured or covered to minimise trip hazards.		

3. Leads must be fully uncoiled before use to prevent overheating. The use of multi-outlet power boards must be kept to a minimum. Where they are used, they must be fitted with an overload protection device or combined overload/RCD device.		
4. Double adaptors and piggyback plugs must not be used in any Veolia workplace due to the risk of overloading and potential fire hazard they present.		
5. All portable Mains Voltage electrical equipment that is used outside, in damp conditions or in hostile environments (high-risk of damage) must be protected with an RCD, either permanently installed as part of the building electrical installation, or of a portable type fitted at the socket outlet.		
6. Veolia semi-portable electrical equipment, such as waste compactors and bin lifters, which is permanently located on customer premises, must be protected with a permanently installed RCD. Equipment supplied on a temporary basis may be protected with a portable RCD fitted at the socket outlet.		
7.. Portable generators and power inverters used to provide electricity for electrical equipment must be fitted with a fixed or portable RCD at the socket outlet.		
8. In certain situations electric arc welders can present a risk of fatal electric shock. To minimise this risk, electric arc welders must be fitted with a risk control measure such as a voltage-reducing device or hand piece trigger switch in accordance.		
> 3.0.1.2 Personal Protective Equipment (PPE)	**C**	**NC**
HUMAN		
1. The employer must provide training to each employee who is required to use PPE in order to be able to know when and what PPE is necessary; how to properly adjust and wear PPE; the limitations of the PPE; and the proper care, maintenance, useful life and disposal of the PPE. A record of training must be kept.		
2. The employee must demonstrate an understanding of the training and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.		
ORGANISATIONAL		
1. You must maintained PPE in a safe, reliable condition and periodically inspect or test them.		
2. You must store insulating equipment in a way that does not damage the material. The following items can cause damage: extremes temperature, UV damage, excessive humidity, ozone (UV rays, arcing), foreign materials (oils, petroleum products, hand lotion, baby powder).		
3. You must inspect insulating equipment for damage before each days use and anytime damage is suspected. Typical damage to insulating equipment might include the following: embedded foreign objects (metal slivers, splinters), holes, punctures, tears or cuts, ozone damage (fine cracks), swelling, softening, sticky or hardening, damage from chemicals.		
4. Before each days use, you must conduct an air testing on insulated gloves. To conduct the test, fill the glove with air and hold against your cheek to feel for and hear releasing air.		
5. You must conduct periodic electrical tests on Electrical Protective Equipment to ensure its protective qualities are still present.		

TECHNICAL	C	NC
1. Personal Protective Equipment (PPE) must be selected depending on the type of electrical testing work and the risks involved such as: • Face Protection—use of a suitably arc rated full-face shield may be appropriate when working where there is potential for high current and arcing. • Eye Protection—metal frames must not be worn. • Gloves—use gloves insulated to the highest potential voltage expected for the work being undertaken. Leather work gloves may be considered for de-energised electrical work. • Clothing—use non synthetic clothing of non fusible material and flame resistant. • Clothing made from conductive material or containing metal threads must not be worn. • Footwear—use non conductive footwear, for example steel toe capped boots or shoes manufactured to a suitable standard.		
2. You must wear non conductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.		
3. You must wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.		
4. When working on energized parts, the possibility of arc flash exists and the employee must be protected. Dangers could include heat, flying hazards and molten metal, therefore the PPE must be durable, non conductive, heat resistant and provide deflection qualities.		
5. When working in areas where there are potential electrical hazards you must be provided with, and must use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed. This clothing must be flame resistant. FR clothing can take the form of pants, shirts, coveralls, jackets, parkas and full flash suits. Obviously, fit, comfort and flexibility are important but the greatest indicator of adequate FR clothing for a given task is based on the "arc thermal performance value" (ATPV). The ATPV is incident energy on a material that results in sufficient heat transfer through the fabric or material to cause the onset of a second degree burn. Manufacturers of FR clothing will provide an ATPV rating on their clothing and you must match the ATPV with the potential exposures in the workplace.		
6. When inspecting and maintaining FR clothing, you must always follow the manufactures recommendations. FR clothing must be visually inspected before each use; however additionally inspections during the work day may be necessary. FR clothing that becomes contaminated with grease, flammable liquids etc. must be removed and sent to be laundered.		
7. You must use effective insulating gloves with high-insulating qualities, while also being comfortable, durable and flexible.		
8. Leather protective gloves must always be worn over Rubber insulating gloves to provide the needed mechanical protection against cuts, abrasion and punctures.		
9. Protective shields, protective barriers, or insulating materials must be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur.		
10. The Arc Suppression Blanket is used as a barrier for protection from the explosive and incendiary effects of electrical arcs and flashes. The blanket can be used for worker protection in underground vaults, switchyards, and other locations where electrical equipment poses a risk of exposure to explosive electrical discharges. NOT an Electrically Insulating Blanket.		

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HUMAN		
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ORGANISATIONAL		
1. You must develop a procedure to manage regular inspections and testing of electrical equipment looking for obvious damage, defects or modifications to the electrical equipment, including accessories, connectors, plugs, cord extension sockets, flexible cords etc. This procedure must also check integrity of protective earth and insulation resistance.		
2. You must ensure that any unsafe electrical equipment at the workplace is locked-out / tagged-out (please refer to LOTO High-Risk Management Standard) then disconnected from its electricity supply. It must not be reconnected until it is repaired or tested and found to be safe or is replaced or permanently removed from use.		
3. You must visually inspect new electrical equipment to ensure that no damage occurred during transport, delivery, installation or commissioning. You must tag new electric equipment with date of the first electrical test according to manufacturer's recommendations, date of next electrical safety test is due and the manufacturer's certificate of compliance. You must update electrical drawings of installation to include new equipment. You must ensure that the electrical equipment is then regularly inspected and tested by a competent person.		
4. You must test this equipment at least once every 12 months. More frequent testing may be required, for example in relation to: • Electrical equipment used in manufacturing and workshop environments (e.g. at least once every 6 months). • Commercial cleaning equipment (e.g. at least once every 6 months). • Hire equipment (e.g. at least once every 3 months). Hiring out electrical equipment must be inspected at the commencement of each hire and tested every 3 months. • Construction or demolition sites (please refer to local law).		
5. You must keep a record of testing until the electrical equipment is next tested, permanently removed from the workplace or disposed of. A record of testing (log book, database, register or similar) must specify the following: name of person who carried out the testing, date of the testing, outcome of the testing and date on which the next testing must be carried out. The record may be in the form of a tag attached to the electrical equipment tested. If the record of testing is a tag, it should be durable, water resistant, non metallic, self-adhesive or well-secured, incapable of re-use and have a bright, distinctive surface.		
6. All portable electrical appliances, tools and extension leads that are required to be tested and tagged must be recorded on a register. The register must detail the make, model, unique reference number, location, test frequency, test date, test results and other pertinent information.		

TECHNICAL		
1. Test instruments must meet the following conditions: • Be suitable for the work in terms of their function, operating range and accuracy. • Be in a good condition and working order, clean and have no cracked or broken insulation. Particular care must be taken regarding the condition of the insulation on leads, probes and clips of test equipment. • Pose no danger of electrocution to workers or damage to the electrical equipment during testing. • Have suitably insulated leads and connection probes that enable connection or contact with energised parts to be made with minimal risk to the electrical worker. • Provide suitable protection against hazards arising from over-voltages that may arise from or during the testing or measurement process.		
2. Test probes and other equipment must be designed and selected so that they cannot inadvertently short circuit between live conductors or live conductors and earth. The terminals of test equipment must be shrouded and all other test sockets on measuring instruments must be designed so as to prevent inadvertent contact with any live test socket or conductor when equipment is in use. Where appropriate, test leads and testing devices need to be provided with suitable fuse protection. Testing equipment, where used in hazardous flammable areas, must be designed and clearly marked as being suitable for use in these conditions.		
3. Equipment used for detecting an energised source must be trialled, immediately before and after the testing, to ensure that it is functioning correctly.		
4. To confirm a positive indication and to establish the circuit voltage, you must use an alternative test instrument that incorporates a visual display before commencing electrical work on the equipment.		
5. Testers for detecting an electric field surrounding an energised conductor may not be suitable for testing cables that are surrounded by a metallic screen, enclosed in a metallic pipe or duct, or cables carrying direct current and in some other circumstances.		
› 3.0.1.4 Residual Current devices (RCDs)	**C**	**NC**
HUMAN		
1. You must ensure that RCDs used at the workplace are tested regularly by a competent person to ensure the devices are working effectively.		
ORGANISATIONAL		
1. A record of testing must be kept until the device is next tested or disposed of. New RCDs must be also tested to ensure they are effective.		
TECHNICAL		
1. You must ensure that any electrical risk associated with the supply of electricity to "plug in" electrical equipment is minimised by the use of an appropriate RCD. If electricity is supplied to the equipment requiring an RCD through a socket outlet not exceeding 20 amps the RCD must have a tripping current that does not exceed 30 milliamps.		
2. This does not apply if the supply of electricity to the electrical equipment: Is extra-low voltage (alternating current), or Is direct current, or Is provided through an isolating transformer that provides at least an equivalent level of protection, or Is provided from a non earthed socket outlet supplied by an isolated winding portable generator that provides at least an equivalent level of protection.		
3. You must ensure that RCDs used at the workplace are selected according to your workplace environment.		

> 3.0.2 REQUIREMENTS FOR HIGH VOLTAGE ELECTRICAL WORK	C	NC
HUMAN		
1. Only competent electrical workers who have received appropriate training in high voltage electrical work are permitted to work on high-voltage electrical equipment. For more information you must seek further advice about working on or near high-voltage electrical installations from a specialist electrical contractor or the local electricity supply authority.		
ORGANISATIONAL		
2. Persons conducting a business or undertaking who have a high voltage electrical installation must prepare an Installation Safety Management Plan for their workplace. The plan must address the risks associated with the operation and maintenance of the high voltage installation. This may include: • A single line diagram for the installation, showing all switches and circuit breakers and their identifying labels or numbers. • Site-specific operating rules covering all aspects of operating the high voltage installation, including procedures for arranging isolation of the installation from the local electricity network. • Procedures for identifying hazardous areas including any confined spaces associated with the installation. • Competency requirements for persons who may be permitted to operate or work on the high voltage installation, including appropriate requirements for re-training, re-testing and re-accreditation. • Induction procedures for contractors. • Regular inspection and maintenance programs to ensure the installation remains serviceable and safe. • Procedures for ensuring there is no extension or alteration of the installation without permission from the local electricity supply authority. • Procedures for the safe handling of insulating oils and other substances that may be required for maintenance or repair. • Procedures including warning signs for ensuring that all parts of the high voltage installation (e.g. underground cables and high voltage overhead power lines) are not damaged by heavy vehicles or other mobile plant, for example mobile cranes.		
> 3.0.3 REQUIREMENTS FOR WORKS NEAR OR UNDERNEATH OVERHEAD ELECTRIC LINES		
> 3.0.3.1 Service Lines on Customer Properties		
ORGANISATIONAL		
1. In the case of overhead service lines on customer premises, a site risk assessment must be conducted prior to commencement of the service taking into account the movement of plant, equipment and materials during the job in order to assess the risk of conflict between the overhead lines and the work activities. Then a decision on the approach distance for the proposed work can be made by a local electrical supply authority. Where it is not possible to ensure a safe distance, additional control measures that are consistent with the requirements of the Electricity Supply Authority must be applied.		
> 3.0.3.2 Overhead Lines on Veolia Properties		
ORGANISATIONAL		
1. Where overhead lines exist on a permanent Veolia site, a risk assessment must be carried out and the appropriate hazard controls established. These controls should include: • Warning signs erected either side of the overhead lines, particularly on any road or access way that passes under or alongside the overhead lines. • Visual indicators such as flag markers, balls or shrouds fitted to the lines. • Installation of height limit barriers. • Barriers constructed at ground level that prevent vehicle/plant access under the lines, and • Safe work procedures and associated training programs developed and implemented.		

> 3.0.3.3 Vehicle Operations in the Vicinity of Overhead Lines	C	NC
HUMAN		
1. Zone A: Unauthorised persons • Unauthorised workers can only work in Zone A. Unauthorised persons are workers who have not received training in overhead line electrical hazards and do not have sufficient training or experience to enable them to avoid the dangers from overhead electric lines and associated electrical equipment. Zone A applies to: • Unauthorised persons performing work in the vicinity of overhead electric lines including plant, hand tools, equipment or other material held by them, and cranes and their loads and mobile plant operated by an unauthorised person in the vicinity of overhead electric lines. • Use a risk assessment to decide whether a safety observer is necessary. The safety observer should monitor work close to Zone B to ensure no workers, plant or equipment enters Zone B. Safety observers who observe the work in Zone B must have successfully completed a relevant training course provided by a registered training organisation. Safety observers must be competent to implement control measures in an emergency and to rescue and resuscitate the worker who is carrying out the work, if necessary. A safety observer must have been assessed in the previous 12 months as competent to rescue and resuscitate a person. Safety observers should be re-assessed annually to ensure their on-going competency to work in the vicinity of overhead electric lines.		
2. Zone B: Authorised persons • Authorised persons are workers who have successfully completed a recognised training course in overhead line electrical hazards, and appointed by the Electricity Supply Authority, so are permitted to work in Zone B.		
3. Zone C: No Go Zone – requires Electricity Supply Authority approval • Zone C is the no go zone around overhead electric lines and associated electrical equipment where no part of a person, material, crane, vehicle or mobile plant may enter while the electric lines and associated electrical equipment are energised, without written approval from the Electricity Supply Authority. Work in this zone is prohibited.		
> 3.0.4 REQUIREMENTS FOR WORKS NEAR UNDERGROUND ELECTRIC LINES		
ORGANISATIONAL		
1. Before starting work and whether at a construction site or not, you must find out from relevant sources what underground electrical cables could create a risk if contacted or damaged. Use this information to plan the work and keep a written record of this information on site. • If excavating in a public place you must identify all electrical cables present. Contact relevant authorities about all cables they may have placed in the vicinity of the excavation: electricity supply authorities, communication companies, local government authorities, and water authorities. • If excavating on private property, contact the owner or occupier of the premises about buried cables before starting work.		
2. Then you must carry out a written risk assessment that must be available on site for the duration of the work. Risk assessment must consider tools damaging cables or equipment (e.g. when digging, driving equipment or excavating where buried electrical cables may be present) and electric cables or equipment being concealed in a work location. If it is not known whether cables, conduits, equipment or situations form an electrical safety risk, you must assume the risk exists or you must have a qualified person investigate and provide a report.		
3. If you cannot determine exactly where an underground cable is, you should use pot-holing to carefully identify the cable location and avoid accidental contact with the cable. Pot-holing involves carefully digging with hand tools to a pre-determined depth to verify if assets exist in the immediate location. You must use insulated hand digging tools suitable for the voltage concerned or use vacuum pumping in the pot-holing process to locate the underground cable.		

4. Where the risk is known, for example where an electrical conduit contains an energised low voltage circuit and there is a risk the conduit could be cut or scraped with a power tool, suitable control measures must be used. This may include having the electricity supply to the site isolated (please refer to the Veolia LOTO Standard). Sometimes when many cables are co-located identifying the isolation point for a particular cable is not easy. A competent and authorised person must be engaged to do the isolation work or it must be necessary to have the Electricity Supply Authority disconnect the supply. De-energising electric lines must be arranged as soon as possible.		
5. If it is not possible to eliminate the risk then the remaining risk can be minimised by applying the hierarchy of controls.		
> 3.0.5 EMERGENCY PLAN FOR WORKS IN THE VICINITY OF OVERHEAD OR UNDERGROUND ELECTRIC LINES	**C**	**NC**
HUMAN		
1. Workers working in the vicinity of overhead electric lines or underground electric lines must be trained on the emergency plan measures applicable to their activity.		
2. Only authorised and equipped people must attempt to rescue a person receiving an electric shock. Secondary deaths often occur because others get electrocuted trying to help earlier victims.		
ORGANISATIONAL		
1. You must ensure an emergency plan is prepared and maintained so it is effective for each workplace or site. This is especially critical for work sites at remote locations. A risk assessment should be done covering potential emergency situations resulting from mobile plant or attached equipment contacting energised electric lines including: • Contact with energised electric lines when the electricity trips. • Contact with the energised electric lines when the electricity does not trip. • A fire starting on the mobile plant or attached equipment. • A grass or bushfire starting. • A tyre catching fire or tyre pyrolysis leading to a tyre explosion, or a combination of any of the above.		
2. An emergency plan should be developed from the results of the risk assessment, consulting with workers, the Electricity Supply Authority or the person with management or control of the electric line or premises and emergency service providers.		
3. The emergency plan must be reviewed and tested at least annually or after any significant change is done to its content.		
4. When a crane, mobile plant or heavy vehicles has been in contact with an energised overhead electric line, it must be checked by a competent person for damage to the components of the equipment. All recommended actions are to be completed before equipment is returned to service.		
> 3.0.6 LIGHTNING PROTECTION		
ORGANISATIONAL		
1. Each site must carry out a lightning study and comply with the recommendations resulting from it. This lightning study must be realized out by a certified and competent body.		

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