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→ Standard on Electrical Safety

# Standard on Electrical Safety

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## 1. Effective date

This Public Works and Government Services Canada (PWGSC) standard takes effect on February 20, 2017. It replaces the version that was originally published on August 8, 2014.

This document will be revised by the Occupational Health and Safety (OHS) Directorate within the next five years or as instructed by the Director, OHS, who is responsible for this standard.

## 2. Context

This departmental *Standard on Electrical Safety* is issued under the authority of the Directive on Occupational Health and Safety – Hazard Prevention Program (007-1). Both documents are part of the department's OHS Policy Suite, which is a hierarchical suite of documents with the Policy on Occupational Health and Safety(007) at the top, a number of supporting directives at the next level, followed by standards (and supplemental procedures, if any) and then guidelines and tools.

This standard is the product of a consultation process involving bargaining agents, departmental branches and regions, functional authorities, as well as the OHS Directorate.

The purpose of this standard is to provide the operational and technical details on what is required of managers and functional specialists to carry out the electrical safety duties referred to in the Directive on Occupational Health and Safety – Hazard Prevention Program (007-1).

It is mandatory for all government departments and agencies to ensure compliance with the legislation and regulations established for electrical safety. In keeping with this responsibility, it is necessary for the department to adopt a program for electrical safety to ensure that the requirements of the *Canada Labour Code*, Part II, the *Canada Occupational Health and Safety Regulations*, and the *Canadian Electrical Code*, Part I, are addressed.

The corresponding provincial/territorial electrical codes should be considered and applied when appropriate to improve the level of safety.

### 3. Standard statement

This standard is designed to provide the details on the implementation of the subject-matter addressed in the Directive on Occupational Health and Safety – Hazard Prevention Program (007-1).

The department must develop, implement and maintain a comprehensive departmental electrical safety program that is in accordance with *the Canada Labour Code*, Part II, the *Canada Occupational Health and Safety Regulations*, the *Canadian Electrical Code*, Part I, and CSA Z462 (*Workplace Electrical Safety*) standard published by the CSA Group (formerly called the Canadian Standards Association) to ensure that:

1. all electrical work/installations at the workplace are recorded in the log book as required, readily available and properly maintained, and that all operating procedures, single-line diagrams and related documents are promptly updated upon completion of the work;
2. all electrical work/installations are undertaken by qualified electricians and that this work is inspected by the local, provincial or territorial authority having jurisdiction insofar as it is reasonably practical;
3. only qualified persons with the required training and experience are authorized to undertake work on electrical equipment or installations;
4. employees are provided with the appropriate training for the duties and tasks they are required to perform;
5. workplace procedures, practices and activities, as well as specific electrical safety procedures, are developed and implemented to ensure the safety and wellbeing of all employees.

### 4. Scope

This departmental standard applies to all Managers/Supervisors, Departmental Representatives (DR) and employees of PWGSC whose duties may involve working on electrical equipment or installations that are "live" or capable of becoming "live".

At PWGSC, the Assistant Deputy Minister (ADM), Human Resources Branch (HRB), in the role of the employer, is responsible for the health and safety of employees and related procedures/committees. In the National Capital Area (NCA), the ADM, Real Property Branch (RPB), and the ADM, Parliamentary Precinct Branch (PPB), and in the regions, the Regional Directors representing the department in the role of the custodian, are responsible for the buildings and related systems.

## 5. Definitions

For definitions, please refer to the departmental [Occupational health and safety policy suite glossary](http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/glossairesst-ohsglossary-eng.html) (<http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/glossairesst-ohsglossary-eng.html>).

## 6. Roles

### Management

**6.1.Branch/Agency Heads and Regional Directors General** are accountable for the implementation of this departmental standard within their areas of responsibility. This accountability is further referenced in the Policy on Occupational Health and Safety(007), Annex A (Flow of information for the occupational health and safety function).

**6.2. The Director, Occupational Health and Safety**, is responsible for:

- 6.2.1.** ensuring the provisions of this standard are implemented and monitoring compliance with them;
- 6.2.2.** monitoring the departmental program to ensure that requirements for electrical safety are met and that procedures are established and implemented;
- 6.2.3.** liaising on behalf of the department, with regulatory bodies and central agencies on related matters.

**6.3.Regional/Area Managers responsible for Occupational Health and Safety** are responsible for:

- 6.3.1.** providing advice with respect to the appropriate procedures, personal protective equipment (PPE) and tools to meet electrical safety requirements for specific tasks or workplaces, based on approved standards and/or consultation with specialists and with the Workplace Health and Safety Committee (WHSC) / Workplace Health and Safety Representative (WHSR);
- 6.3.2.** monitoring workplaces and reviewing the electrical log books, i.e. PWGSC-TPSGC 69 (Record of Electrical Work) form, in the Electronic Forms Application (ELF), at least every 6 months to ensure that requirements with respect to electrical safety are adhered to;
- 6.3.3.** ensuring that the required ELF forms from amongst the following list are completed and maintained:
  - PWGSC-TPSGC 12 (Isolation Procedures)
  - PWGSC-TPSGC 12-1 (Re-energization Procedures)
  - PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
  - PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization);

**6.3.4.** ensuring that electrical inspections are carried out as required to ensure the electrical work/installations were installed in accordance with codes;

**6.3.5.** investigating specific workplace complaints concerning electrical safety and taking appropriate action;

**6.3.6.** reporting periodically to the Director, OHS, on compliance with the electrical safety program.

**6.4.Senior Employer Representatives** are responsible for ensuring that all workplaces within their area of responsibility implement the requirements of this departmental standard.

**6.5.Directors with workers under their authority who perform activities subject to this standard** are responsible to approve energized electrical work performed by their employees by completing and signing the applicable permits.

**6.6.Managers/Supervisors of departmental technical/electrical staff** must implement this standard, as required by the nature of the tasks for which they are responsible, by:

**6.6.1.** identifying, assessing and addressing hazards in the workplace, including ergonomic hazards, in accordance with the Hazard Prevention Program to ensure that employees are not exposed to uncontrolled hazards;

**6.6.2.** taking the general electrical safety training in order to be able to help in establishing and implementing, in consultation with the employees and the WHSC/WHSR, the appropriate electrical safety procedures;

**6.6.3.** consulting the Regional/Area Manager responsible for OHS concerning electrical safety procedures to meet specific requirements;

**6.6.4.** informing the Guarantor of an unscheduled electrical interruption;

**6.6.5.** implementing the required reporting procedures, in the event of a hazardous occurrence related to electrical safety;

**6.6.6.** ensuring that during construction activities, temporary single-line as-built drawings are posted;

**6.6.7.** advising the Guarantor of any modifications required to the single-line diagrams;

**6.6.8.** ensuring that each person working on electrical equipment or installations is qualified for the duties they are required to perform;

**6.6.9.** submit for authorization written lockout procedures and an arc flash/shock hazard assessment, along with ELF form PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization) to the Guarantor for approval before work begins;

**6.6.10.** investigating, prior to isolating equipment or installations, to ensure that the isolation of the circuit will not create unplanned operational problems;

- 6.6.11.** ensuring that personal locks, danger tags, and a series numbered padlock/lockout box system are available to employees who perform duties which include locking out equipment;
- 6.6.12.** ensuring that the appropriate ELF forms from amongst those that follow are prepared by a qualified person, checked by a second qualified person prior to commencement of work and that they are available to the employees during the time they are performing the work:
- PWGSC-TPSGC 12 (Isolation Procedures)
  - PWGSC-TPSGC 12-1 (Re-energization Procedures)
  - PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures);
- 6.6.13.** arranging for the inspection of the electrical work/installations by the local, provincial or territorial authority having jurisdiction insofar as it is reasonably practical where the work has been done by a departmental electrician;
- 6.6.14.** notifying the Guarantor, in writing, of any modifications or additions that have been made to electrical equipment or installations and providing copies of updated single-line diagrams, as applicable;
- 6.6.15.** ensuring that single-line diagrams and the following electrical safety records (i.e. ELF forms) are properly completed:
- PWGSC-TPSGC 12 (Isolation Procedures)
  - PWGSC-TPSGC 12-1 (Re-energization Procedures)
  - PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
  - PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization);
- 6.6.16.** ensuring that the ELF forms mentioned in bullet 6.6.15. are kept on file for one year; if a hazardous occurrence or a non-compliance issue subsequently occurs, ensuring they are kept on file for ten years;
- 6.6.17.** ensuring written emergency procedures are developed and implemented if and when required;
- 6.6.18.** ensuring a written arc flash/shock hazard assessment is developed prior to work;
- 6.6.19.** ensuring that all required PPE and tools are provided for the specific tasks to be undertaken;
- 6.6.20.** ensuring ELF form PWGSC-TPSGC 494 (Energized Electrical Work Permit) is completed and submitted to the employee's Director for approval when required;
- 6.6.21.** ensuring that testing, maintenance and storage routines are established and implemented for all PPE and tools as per prescribed standards and equipment instructions;
- 6.6.22.** ensuring that the required precautionary measures have been implemented before work commences, i.e., lockout procedures; grounding; guarding; etc.;

**6.6.23.** ensuring that the equipment or installation is isolated (and grounded where applicable) prior to work being started;

**6.6.24.** reviewing with the employees, the required tools to be utilized, PPE and procedures to be followed;

**6.6.25.** determining the requirement for an Electrical Safety Watcher, and selecting a qualified person, suitable to perform these duties;

**6.6.26.** overseeing the work to ensure that established procedures are implemented.

## Functional

**6.7.** The **Guarantor** is responsible for:

**6.7.1.** developing and implementing procedures to ensure that only authorized persons are provided access to electrical rooms/cabinets and transformer rooms;

**6.7.2.** ensuring that the required signage is posted at each approach to live high voltage electrical equipment;

**6.7.3.** ensuring written lockout procedures and an arc flash/shock hazard assessment have been provided with ELF form PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization) prior to authorization and making the necessary arrangements for the specific timeframe;

**6.7.4.** ensuring that the appropriate ELF forms from amongst the following are properly completed:

- PWGSC-TPSGC 12 (Isolation Procedures)
- PWGSC-TPSGC 12-1 (Re-energization Procedures)
- PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
- PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization);

**6.7.5.** ensuring there is no other work being undertaken at the time of isolation that will interfere, until isolation time has expired, and it is safe to commence the other activity;

**6.7.6.** informing all occupants, who will be affected, of the isolation;

**6.7.7.** providing information to all occupants affected as well as the WHSC/WHSR, as soon as possible, in the event of an unscheduled electrical interruption;

**6.7.8.** ensuring that a log of electrical work/installations is established and maintained;

**6.7.9.** ensuring all electrical work/installations are inspected by the local, provincial or territorial authority having jurisdiction insofar as it is reasonably practical;

**6.7.10.** ensuring preventive maintenance on electrical equipment is performed as per departmental policies and prescribed standards;

**6.7.11.** ensuring detailed arc flash labelling is performed on all electrical equipment as per CSA Z462 (*Workplace Electrical Safety*);

**6.7.12.** ensuring single-line diagrams are reviewed on a regular basis and that they are up to date;

**6.7.13.** ensuring that single-line diagrams are posted in a glass frame at vault entrances, in main electrical rooms and in generator rooms;

**6.7.14.** ensuring that single-line diagrams are updated after modifications have been made to the electrical distribution.

**6.8.** The **Electrical Safety Watcher** is responsible for:

**6.8.1.** ensuring that electrical safety procedures are observed;

**6.8.2.** ensuring that all required PPE and safety equipment and devices are utilized as prescribed, and have been properly inspected and tested;

**6.8.3.** stopping immediately work considered dangerous;

**6.8.4.** implementing emergency procedures as required.

**6.9.** When in the role of **Owner**, a Public Works and Government Services Canada **Departmental Representative** who engages the services of a contractor or a **prime contractor/principal contractor/constructor** in which the work or project includes electrical work/installations, the **Departmental Representative** is responsible for:

**6.9.1.** ensuring the contractor or prime contractor/principal contractor/constructor (PC/C) provides a written arc flash/shock hazard assessment and requiring that precautionary measures be implemented before work commences, i.e., lockout procedures, grounding, guarding, PPE, etc.;

**6.9.2.** ensuring the contractor or PC/C provides written emergency procedures prior to work beginning and that they are implemented when required;

**6.9.3.** ensuring ELF form PWGSC-TPSGC 494 (Energized Electrical Work Permit) is completed and submitted for approval when required;

**6.9.4.** ensuring inspection permits are obtained before work begins from the local, provincial or territorial authority having jurisdiction insofar as it is reasonably practical;

**6.9.5.** ensuring that single-line diagrams, panel legends and equipment labels for all electrical work/installations are updated, as required, upon completion of the work;

**6.9.6.** ensuring work is recorded in the electrical log book;

**6.9.7.** if the scope of work includes the isolation of electrical equipment, the contractor or PC/C's qualified person must complete ELF form PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization) and return to the DR. The DR is responsible for:

- 6.9.7.1.** ensuring the written isolation and re-energization procedures have the names and signatures of qualified persons, i.e. the signature of the person who prepared the procedures and the signature of the contractor approving the procedures;
- 6.9.7.2.** printing their name, signing and dating the "requested by" in section A of ELF form PWGSC-TPSGC 13;
- 6.9.7.3.** submit for authorization written lockout procedures and an arc flash/shock hazard assessment, along with ELF form PWGSC-TPSGC 13, to the Guarantor for approval before work begins;
- 6.9.7.4.** returning the approved ELF form PWGSC-TPSGC 13 to the contractor or PC/C before work begins;
- 6.9.7.5.** ensuring the contractor or PC/C's qualified person completes and signs sections C, D and E of ELF form PWGSC-TPSGC 13 (during the work activity and returning it to the DR after work is completed);
- 6.9.7.6.** ensuring that ELF form PWGSC-TPSGC 13 is completed and the electrical contractor's isolation/re-energization procedures are returned to the DR.

## Committees and representatives

**6.10. Workplace Health and Safety Committees and Workplace Health and Safety Representatives** are responsible for:

- 6.10.1.** monitoring workplaces on a quarterly basis to ensure that the required signage is in place, log books and related records of electrical work/installations are established and maintained, procedures have been developed and implemented, as well as ensure that single-line diagrams and as-built drawings and specifications have been updated and are posted as required;
- 6.10.2.** consulting the Regional/Area Manager responsible for OHS regarding electrical safety issues;
- 6.10.3.** reporting immediately, specific workplace complaints regarding electrical safety that cannot be resolved with the Manager/Supervisor, by following the Internal Complaint Resolution Process.

## Employees

**6.11. Employees** are responsible for:

- 6.11.1.** adhering to instructions, training and established procedures related to electrical safety;
- 6.11.2.** following all safety instructions from the Manager/Supervisor and the Electrical Safety Watcher;



**6.11.3.** performing a bump test prior to working on isolated equipment to validate equipment isolation;

**6.11.4.** reporting hazardous conditions or practices to the Manager/Supervisor immediately;

**6.11.5.** reporting a hazardous occurrence to the Manager/Supervisor immediately.

## 7. Compliance

Compliance with this standard is mandatory.

Reporting is also a mandatory requirement and the procedure should be followed as outlined in this standard and its supporting instruments.

Failure of an employee, at any level, to comply with this standard may be considered as misconduct and therefore be subject to consequences as per the applicable departmental and Treasury Board policies.

## 8. Monitoring and reporting

All hazardous occurrences in PWGSC-controlled workplaces sites must be reported and investigated by a qualified person and recorded in accordance with the departmental *Standard on Hazardous Occurrence Investigation and Reporting*.

### 8.1. Monitoring

The requirements of the electrical safety program will be monitored on a quarterly basis by the Regional/Area Manager responsible for OHS and the network of the WHSCs/WHSRs, to ensure that:

- log books and related records of electrical work/installations are established and maintained
- appropriate electrical safety procedures have been developed and implemented
- appropriate signage and single-line diagrams are posted as required
- the appropriate ELF forms from those in the following list are completed and maintained:
  - PWGSC-TPSGC 12 (Isolation Procedures)
  - PWGSC-TPSGC 12-1 (Re-energization Procedures)
  - PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
  - PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization)

### 8.2. Reporting

Inconsistencies with requirements, or other issues related to electrical safety that cannot be resolved at the workplace level must be escalated to the Regional/Area Health and Safety Committee after 2 meetings. Issues that cannot be resolved at the regional level must be escalated to the National Health and Safety Policy Committee (NHSPC) after 2 meetings.

Regional/Area Managers responsible for OHS report periodically to the Director, OHS, on compliance with the electrical safety program.

## **9. Procedures**

### **9.1. General electrical procedures**

#### **9.1.1. General safety precautions**

Safe work practices must be implemented to safeguard employees working on or near, exposed electrical conductors or circuit parts that are, or may become, energized. The safe work procedures implemented must be consistent with the type of work to be undertaken and the extent of the electrical hazards.

#### **9.1.2. Unscheduled electrical interruptions**

The Manager/Supervisor must report any unscheduled interruption to the Guarantor.

Unscheduled interruptions that occur during normal working hours must be reported immediately. Interruptions that occur during silent hours must be reported the following morning if the nature of the interruption is of a non-critical nature.

When partial or complete isolation is required in an emergency situation, the work must be coordinated as necessary and undertaken by qualified persons.

In the event of an emergency situation and the requirement to isolate, all possible advance notice must be provided to the Guarantor prior to isolation. Upon being notified the Guarantor must inform the WHSC/WHSR, as well as all occupants or client departments affected by the unscheduled isolation.

#### **9.1.3. Single-line diagrams**

Copies of the latest updated single-line diagrams are to be posted in a glass frame at vault entrances, in main electrical rooms and in generator rooms.

Color Coding for Electrical Single-line Diagrams will be as follows:

1. Blue for high voltage above 750 volts
2. Red for emergency power
3. Black for low voltage below 750 volts
4. Orange for Uninterruptable Power Supply (UPS)

### **9.1.4. Working in proximity of live electrical parts**

In accordance with column II of Annex A: Required distances from live electrical parts, when employees who are not qualified persons (such as Building System Technicians, departmental commissioning agents, etc.) are permitted to perform non-electrical tasks or activities in close proximity to live electrical equipment, the work must be coordinated through the Manager/Supervisor.

If non-qualified persons are entering within the boundaries specified in column III of Annex A, a qualified person must be selected as the Electrical Safety Watcher. The Electrical Safety Watcher will have the authority to remove any person who they believe is not behaving appropriately.

In all instances, when working in the boundaries specified in column II or III of Annex A, all safety precautions must be implemented and all employees must be provided with the necessary instructions and personal protective equipment with regard to the related hazards, prior to commencement of the work.

Upon informing the Manager/Supervisor, qualified persons may enter vaults within the boundaries indicated in column III of Annex A.

### **9.1.5. Contracts for electrical work**

Contracts for electrical work must include a clause which will ensure compliance with the OHS requirements of CSA Z462 (*Workplace Electrical Safety*). In addition, the contract must state that the contractor is responsible to ensure that the individuals who will undertake the work are qualified licensed workers or apprentices in accordance with provincial/territorial acts respecting manpower vocational training and qualification.

Proof of an electrical permit must be provided before permission to undertake the work is granted as per the *Canadian Electrical Code*, Part I.

Where applicable, inspection permit approval must be obtained before the work is considered completed.

## **9.2. Electrical safety procedures**

### **9.2.1. Development and implementation of workplace procedures**

The Manager/Supervisor must ensure that safety procedures, appropriate to the OHS requirements of the work that is to be undertaken, are developed, implemented, and in compliance with CSA Z462 (*Workplace Electrical Safety*) and CSA Z460 (*Control of Hazardous Energy – Lockout and Other Methods*).

### **9.2.2. Personal protective equipment and tools**

Managers/Supervisors must ensure that required PPE, tools, and equipment approved for the work to be undertaken on electrical equipment and installations, are provided to employees.

When working on, testing, repairing, adjusting, or operating electrical equipment, employees required to work on electrical equipment and installations must wear protective clothing and use the insulated tools and equipment as prescribed by CSA Z462.

### **9.2.3. Authorization for electrical isolation**

Authorization must be obtained from the Guarantor responsible for the electrical equipment or installation prior to isolation. The Manager/Supervisor must complete ELF form PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization) and must present this form to the Guarantor for authorization.

Authorization for any power isolation which will affect occupants or system users, must be received from the Guarantor at least one week prior to commencement of the work. Confirmation of the isolation must be made on the preceding regular workday, and reconfirmed immediately preceding the planned power shut down.

#### **Partial power isolation**

Authorization for partial power isolation must be obtained from the individual responsible for the operation of the equipment or installation affected. Arrangements must be made, with acceptable advance notice, and reconfirmed on the preceding regular workday.

#### **Total power isolation**

When an entire building will be affected, the approval for isolation must be coordinated through one Guarantor. If there are a number of buildings supplied from the same electrical distribution centre, the isolation must be coordinated through one Guarantor.

The Guarantor will be responsible for informing all occupants or client departments affected by the isolation as well as the WHSC/WHSR.

The Manager/Supervisor or the departmental Representative must ensure that no more than one Guarantor is approached to authorize isolation of electrical equipment or an installation for the same time period. In emergency situations, an unscheduled isolation will be undertaken as required. All possible notice will be provided. If an unscheduled interruption occurs during normal working hours, it must be reported immediately to the Guarantor. If the interruption is of a non-critical nature and occurs during the silent hours, the interruption must be reported immediately the next working day.

Examples of electrical equipment and installations that are subject to isolation are as follows:

- main building power feeders
- feeder supply panels and sub-panels

- bus ducts
- motor control centres
- emergency power circuits
- motors for fans, pumps, etc.
- uninterruptable power supply
- battery banks
- fire protection equipment
- lighting systems

The following ELF forms must be completed and maintained on site for examination by the employees while the work is being undertaken:

- PWGSC-TPSGC 12 (Isolation Procedure)
- PWGSC-TPSGC 12-1 (Re-energization Procedures)
- PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
- PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization)

ELF form PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization) indicates if the work requires the update of single-line diagrams. A copy of the updated single-line diagram must also be forwarded to the Guarantor when applicable.

As-built drawings must be updated on a regular basis to ensure that current information is represented.

#### **9.2.4. Electrical isolation – re-energization form**

When procedures involve more than one operation or when high-voltage equipment or installations are isolated, the appropriate ELF forms from the following must be prepared by the Manager/Supervisor, and copies must be provided to the employees:

- PWGSC-TPSGC 12 (Isolation Procedure)
- PWGSC-TPSGC 12-1 (Re-energization Procedures)
- PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
- PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization)

The forms include written instructions regarding the correct sequence to follow in the isolation process and the procedure to follow to re-energize the equipment or installation upon completion of the work. These forms also include pertinent information relating to the isolation/re-energization procedure, i.e., "date", "time of preparation", "prepared by", "checked by", "issued by", "performed by", "operating diagram adjustment by" and the names and signatures of those involved in the process.

#### **9.2.5. Electrical Safety Watcher**

Where an employee is working on or near live electrical equipment and, because of the nature of the work or the condition or location of the workplace, it is necessary for the safety of the employee that the work be observed by a person not engaged in the work, the employer must appoint an electrical safety watcher.

An electrical safety watcher must be selected when high voltage work is to be undertaken on or near an electrical facility or installation and when working within the boundaries of column III of Annex A: Required distances from live electrical parts.

The Electrical Safety Watcher must be selected by the Manager/Supervisor and be a qualified person with the required certification, or a combination of certification and technical training for the work that is to be undertaken. In addition, this individual must possess the necessary training in safety and emergency procedures. The Electrical Safety Watcher is to be informed of the hazards involved in the work.

The Electrical Safety Watcher must be free of all other duties that are not related to the duties of the Electrical Safety Watcher.

This person must be clearly identified as the Electrical Safety Watcher to those performing the work.

The Electrical Safety Watcher is authorized to immediately stop any part of the work that they consider dangerous.

### **9.2.6. Lockout and danger tags**

#### **When one lock is required to isolate equipment**

A PWGSC personal lock and danger tag must be utilized when isolating one piece of equipment. Refer to Annex B: Danger tag.

The danger tag must be properly completed and attached (to the personal padlock) to isolated equipment prior to beginning work. The Danger Tag must include all of the following information:

- Description of the work to be undertaken and the date and hour that the work is started
- Employee Name
- Signature and Phone Number
- Isolation Request Number

Once the work is completed and the equipment is ready to be returned to service, the employee will remove, initial and return the tag to the Manager/Supervisor, who must keep it on file for a period of one year.

When more than one employee is working on the electrical equipment, one tag must be attached to each employee's personal padlock.

A lock and danger tag should only be removed by the employee who completed and attached it, and must never be removed without the prior knowledge of this employee.

### **When more than one lock is required to isolate equipment**

A series numbered padlock/lockout box system must be used.

The PWGSC danger tags can be omitted provided the locks installed on the equipment are identified by a number, color and the following ELF forms are completed, secured, and visible to all employees working on the equipment:

- PWGSC-TPSGC 12 (Isolation Procedures)
- PWGSC-TPSGC 12-1 (Re-energization Procedures)
- PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)

Once the work is completed and the equipment is returned to service, the following ELF forms must be returned to the Manager/Supervisor, who must maintain them on file:

- PWGSC-TPSGC 12 (Isolation Procedures)
- PWGSC-TPSGC 12-1 (Re-energization Procedures)
- PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)

### **Training requirements**

Employees will be provided with health and safety training as to the proper lock usage for single or multiple equipment isolations, as well as danger tag and the following ELF forms:

- PWGSC-TPSGC 12 (Isolation Procedures)
- PWGSC-TPSGC 12-1 (Re-energization Procedures)
- PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)

### **9.2.7. Preparation of isolation procedures**

This procedure must include all of the following:

- a sequence of operation to allow for an orderly shutdown
- a list of safety equipment required
- the point for safety grounding (when applicable)
- the location and number of padlocks or danger tags required
- a sequence of operation to allow for orderly re-energization

Prior to the preparation of isolation procedures, the Manager/Supervisor must become familiar with the existing equipment, single-line diagrams as well as the new installation and any other project related documents. This is undertaken in order to determine the existence of potentially hazardous equipment, and the requirement for the implementation of additional precautionary measures to prevent accidents. These requirements must be included in the isolation procedure.

Examples of situations where existing equipment requires that additional precautionary measures be implemented, are as follows:

- auxiliary power supplies that start automatically
- uninterruptable power supplies (static or rotary)
- solid state controllers equipped with silicon controlled rectifier (SCR's)
- capacitors utilized for power factor correction and in motor circuits
- battery banks
- solar panels

The need to determine the existence of an auxiliary power supply relates to the fact that numerous auxiliary power supplies are in use. The manufacturer's recommendations must be followed when isolating equipment or installations where these power supplies exist.

ELF forms PWGSC-TPSGC 12 (Isolation Procedures), PWGSC-TPSGC 12-1 (Re-energization Procedures), or PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures) must be used when isolating more than one piece of equipment or when isolating high voltage equipment.

No repairs or alterations will be carried out on any live equipment except where complete disconnection of the equipment is not practical.

Any interruption to electrical service will be undertaken as per the requirements indicated in section 9.2.3. (Authorization for Electrical Isolation).

### **9.2.8. Live electrical equipment or installations**

#### **ELF form PWGSC-TPSGC 494 (Energized Electrical Work Permit)**

Unless the work is diagnostic in nature, employees required to work on energized electrical equipment and installations must complete, prior to work, part 2 of ELF form PWGSC-TPSGC 494 (Energized Electrical Work Permit), the Manager/Supervisor must complete and sign part 1 of the form, and the employee's Director must review and sign part 3 of the form.

### **9.2.9. Distance from live electrical parts**

When live electrical equipment is not guarded or insulated, or when an employee is not insulated from ground, the required distances indicated in the table of Annex A: Required distances from live electrical parts must be strictly observed.

No person will work near an exposed live electrical part when there is the possibility that an unintentional movement would bring the employee's body, or any item that the employee is in contact with, closer to the live part than the table illustrated in Annex A.

### **9.2.10. Guarding**



When work is to be undertaken on or near live equipment or installations, or where equipment may become live, the Manager/Supervisor must ensure that the equipment or installation is appropriately guarded, when possible, and that warning signs are readily visible as required.

### 9.3. Occupational health and safety training

Occupational health and safety training relating to electrical safety must be provided based on the duties and responsibilities that employees are required to undertake. The development and implementation of training methods for electrical safety must be undertaken as per the *Standard on Occupational Health and Safety Training*.

*General electrical safety training* relevant to all employees in the workplace must be developed and provided by the Occupational Health and Safety Directorate.

This general electrical safety training must be provided to those employees who must have an understanding of their duties in relation to the requirements of the departmental *Standard on Electrical Safety*, associated legislation, prescribed standards and codes. This training will touch on subjects such as, documentation protocol, emergency procedures, and electrical safety awareness and will be directed towards the following employees:

- Property and Facility Managers who are required to provide authorization for the undertaking of electrical work/installations in the buildings or facilities for which they are responsible
- Managers/Supervisors who are required to manage or supervise the work of qualified persons
- building system technicians and electricians
- Departmental Representatives who manage contracts/projects which include electrical work/activity conducted by private sector companies

When employees require ***specific work-related technical training***, the employer must provide the necessary training.

### 9.4. Records and recording

#### 9.4.1. Electrical work/installation log book

A log, ELF form PWGSC-TPSGC 69 (Record of Electrical Work), of electrical work/installations must be implemented and maintained by each Guarantor.

This log (PWGSC-TPSGC 69) must provide a written record of all electrical work/installations undertaken in buildings or facilities, which require inspection.

This log (PWGSC-TPSGC 69) will be presented for inspection at the time of certification.

#### 9.4.2. Certification of electrical work/installations

## Inspections

The Manager/Supervisor or the departmental Representative must ensure that all electrical work/installations are inspected as per the *Canadian Electrical Code*, Part I.

Inspection certificate numbers are logged in ELF form PWGSC-TPSGC 69 (Record of Electrical Work).

## 10. References and forms

### Acts and regulations

- *Canada Labour Code* (<http://laws-lois.justice.gc.ca/eng/acts/l-2/>), Part II
- *Canada Occupational Health and Safety Regulations* (<http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/>)
  - *Part VIII – Electrical Safety* (<http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/page-15.html#h-81>)
  - *Part XII – Safety Materials, Equipment, Devices and Clothing* (<http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/page-31.html#h-160>)

### National Joint Council publication

- *Occupational Health and Safety Directive, Part VIII* (<http://www.njc-cnm.gc.ca/directive/index.php?sid=258&hl=1&lang=eng>)

### Public Works and Government Services Canada publications

- *Policy on Occupational Health and Safety (007)* (<http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/politique-policy/p007-eng.html>)
- *Directive on Occupational Health and Safety – Hazard Prevention Program (007-1)* (<http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/politique-policy/p007-1-eng.html>)
- *Standard on Working Alone* (</eng/services/rh-hr/santeseuritettravail-occupationalhealthsafety/normes-documents-standards/Pages/travail-seul-work-alone.aspx>) (007-1-3)
- *Standard on Entry into Confined Spaces* (</eng/services/rh-hr/santeseuritettravail-occupationalhealthsafety/normes-documents-standards/Pages/espacesclos-confinedspaces.aspx>) (007-1-4)
- *Standard on First Aid* (</eng/services/rh-hr/santeseuritettravail-occupationalhealthsafety/normes-documents-standards/Pages/secourisme-firstaid.aspx>) (007-1-5)
- *Standard on Hazardous Substances* (</eng/services/rh-hr/santeseuritettravail-occupationalhealthsafety/normes-documents-standards/Pages/dangereuses-substances-hazardous.aspx>) (007-1-6)

- [Standard on Hazardous Occurrence Investigation and Reporting](http://eng/services/rh-hr/santeseuritetavail-occupationalhealthsafety/normes-documents-standards/Pages/enquetes-rapports-investigation-reporting.aspx) ([/eng/services/rh-hr/santeseuritetavail-occupationalhealthsafety/normes-documents-standards/Pages/enquetes-rapports-investigation-reporting.aspx](http://eng/services/rh-hr/santeseuritetavail-occupationalhealthsafety/normes-documents-standards/Pages/enquetes-rapports-investigation-reporting.aspx)) (007-1-8)
- [Standard on Personal Protective Equipment and Clothing for Employees](http://eng/services/rh-hr/santeseuritetavail-occupationalhealthsafety/normes-documents-standards/Pages/equipement-protect-equipment.aspx) ([/eng/services/rh-hr/santeseuritetavail-occupationalhealthsafety/normes-documents-standards/Pages/equipement-protect-equipment.aspx](http://eng/services/rh-hr/santeseuritetavail-occupationalhealthsafety/normes-documents-standards/Pages/equipement-protect-equipment.aspx)) (007-1-10)
- [Directive on Construction Occupational Health and Safety \(007-2\)](http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/politique-policy/p007-2-eng.html) (<http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/politique-policy/p007-2-eng.html>)
- [Occupational health and safety policy suite glossary](http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/glossairesst-ohsglossary-eng.html) (<http://gcintranet.tpsgc-pwgsc.gc.ca/pm-dp/glossairesst-ohsglossary-eng.html>) and other documents in the OHS Policy Suite (directives, standards, procedures, guidelines and tools)

## Other publications

- CSA Group (formerly called the Canadian Standards Association) standards
  - CSA 22 – *Canadian Electrical Code, Part I*
  - CSA Z460 – *Control of Hazardous Energy – Lockout and Other Methods*
  - CSA Z462 – *Workplace Electrical Safety*
- *Provincial electrical safety code* that is applicable for the province where the work is to be undertaken

## Forms

- Public Works and Government Services Canada ELF forms
  - PWGSC-TPSGC 12 (Isolation Procedures)
  - PWGSC-TPSGC 12-1 (Re-energization Procedures)
  - PWGSC-TPSGC 12-2 (Isolation – Re-energization Procedures)
  - PWGSC-TPSGC 13 (Request for Electrical Isolation and Re-energization)
  - PWGSC-TPSGC 494 (Energized Electrical Work Permit)
  - PWGSC-TPSGC 69 (Record of Electrical Work)

## 11. Cancellation

This standard replaces former departmental policy (DP) 058, *Policy on Electrical Safety*.

## 12. Enquiries

### Departmental

Director, Occupational Health and Safety

Telephone:

819-956-6961

Email:

[tpsgc.dsstprojetpolitique-ohsdpolicyproject.pwgsc@tpsgc-pwgsc.gc.ca](mailto:tpsgc.dsstprojetpolitique-ohsdpolicyproject.pwgsc@tpsgc-pwgsc.gc.ca)  
 (mailto:tpsgc.dsstprojetpolitique-ohsdpolicyproject.pwgsc@tpsgc-pwgsc.gc.ca)

## Regional/Area

- Regional Managers responsible for Occupational Health and Safety
- Area Manager responsible for Occupational Health and Safety

## Annex A: Required distances from live electrical parts

Column I Voltage range of part: part to ground	Column II Distance in metres Not qualified	Column III Distance in metres Qualified person
Over 425 to 12,000	3	0.9
Over 12,000 to 22,000	3	1.2
Over 22,000 to 50,000	3	1.5
Over 50,000 to 90,000	4.5	1.8
Over 90,000 to 120,000	4.5	2.1
Over 120,000 to 150,000	6	2.7
Over 150,000 to 250,000	6	3.3
Over 250,000 to 300,000	7.5	3.9
Over 300,000 to 350,000	7.5	4.5
Over 350,000 to 400,000	9	5.4

## Annex B: Danger tag

### Image 1: Danger tag, front view



### Text version

The Public Works and Governments Services Canada danger tag is attached to equipment to warn people that it is dangerous to operate the equipment tagged and to provide the name and contact information of an authorized person for more information.

On the front of the label, the department name is indicated at the top, followed by the word **DANGER** in large uppercase letters to draw attention.

The words "Do not operate" and "See other side" are printed in the middle of the tag.

On the bottom, there is a message in smaller lettering indicating that the tag may only be removed by the authorized person identified on the back of the label. The following contact number is also provided: 613-745-2939.

## Image 2: Danger tag, back view

PWGSC

Travaux publics et  
Services gouvernementaux  
Canada

Public Works and  
Government Services  
Canada

**DANGER**

**DO NOT OPERATE**  
**DÉFENSE D'ACTIONNER**

Name of Authorized Employee - Nom de l'employé(e) autorisé	
Telephone - Téléphone	Isolation Request No. Numéro de la demande d'isolement
Description (Work/Travail)	
Signature	Date

THIS TAG TO BE REMOVED ONLY BY AUTHORIZED  
PERSON MENTIONED ABOVE.  
CETTE ÉTIQUETTE NE DOIT ÊTRE ENLEVÉE QUE PAR  
LA PERSONNE AUTORISÉE MENTIONNÉE AU CI-HAUT.

BLR SAFETY (613) 745-2939

### Text version

The Public Works and Governments Services Canada danger tag is attached to equipment to warn people that it is dangerous to operate the equipment tagged and to provide the name and contact information of an authorized person for more information.

On the back of the label, the department name is indicated at the top, followed by the word DANGER in large uppercase letters to draw attention.

In the middle, the words "Do not operate" are printed, followed by spaces for providing the following information about the authorized employee who can be contacted for information or in case of emergency:

- Name of authorized employee
- Telephone number
- Isolation request number
- Brief description of work to be undertaken
- Signature
- Date

On the bottom, there is a message in smaller lettering indicating that the tag may only be removed by the authorized person identified above. The following contact number is also provided: 613-745-2939.

**Date modified:**

2018-07-25