# Minimum Training Requirements

## Qualified Electrical Workers
## & High Voltage Electrical Safety

June 2008

Saskatchewan
Ministry of
Advanced Education,
Employment and
Labour

## Time for compliance

The OHS Division shall grant employers and contractors until June 1, 2009 to comply with the following training standards provided the process to develop and deliver approved training is commenced. Prior to June 1, 2009, it is not considered unusually dangerous for qualified electrical workers to continue to perform high voltage work, they have previously performed, provided the employer and contractor is otherwise in compliance with regulatory requirements related to electrical work.

## 1. Course Outline:

**A. Legislation applicable:**

Review current applicable Saskatchewan Occupational Health and Safety Regulation(s)

- ***17 – Supervision of Work***
- ***19-Training of workers***
- ***87- Personal Protective Equipment – general responsibilities***
- 91(3) – Protective Headwear
- 93 – Eye and face protection
- 94 – Skin Protection
- 97(2) – Hand and arm protection
- 139 – Lockout
- Part XXX – Additional Protection for Electrical workers (relevant sections)
- 465 – Proximity to exposed energized high voltage conductors
    - ***465(5) Written procedures for high voltage work.***
- Table 22 – Minimum Distances from Exposed Energized High Voltage Conductors

**B. Standards applicable:**

Review applicable workplace standards

- Canadian Electrical Code (CEC), Part I – 2-304 – Disconnection2-306 – Shock and flash protection
- NFPA 70E – CSA *Z462* ***(Except those portions addressed in public utilities operating standards)***
- ***In the case of a public utility, the utilities operating standards.***

**C. Hazard Analysis**

- Review the three types of electrical hazards*: **electrocution, arc flash, and arc blast***. Describe conditions required for each to occur. Describe procedures to reduce these hazards.
- Describe the impact of ***voltage, amperage and time*** on the level of *electrocution* and flash hazard.
- Describe fault current available. ***Where applicable to their work***, review calculation methods for a supply transformer and describe the impact of fault current on the level of electrical hazard.
- Describe potential gradients as they relate to ground faults.
- Applicable definitions: step, touch, mesh, and transferred potentials. Describe how & where they may appear during a ground fault.

**D. Operation of Electrical Equipment**

- Identify high voltage configurations permitted under CEC and those in use by Saskatchewan utilities (***as applicable***).
- Review circuits, ***line*** diagrams, drawing symbols ***and all isolation points*** related to high voltage installations.
- Review essential features of an acceptable electrical isolation point(***s***).
- Review line diagrams and their application in high voltage systems.
- Describe operation and function of mechanical and key interlock systems
- Identify examples of equipment or situations with multiple energy sources. Review how systems may supply energy unexpectedly to a system that has been isolated from its normal sources. ***(e.g., magnetically assisted cranes)***
- Compare the differences between metal ***enclosed*** and open-air switchgear.
- Review examples of equipment with non-electrical energy sources and explain how these potentially hazardous sources can be isolated or neutralized.
- **Grounding and dissipation of residual energy**

**E. Lockout/*Isolation***

- Define terms lockout, tag out ***and isolation***. Explain how these terms apply to electrical safety systems.
- Identify typical lockout mechanisms and devices.
- Review elements of written lockout procedures.
- Describe safety procedures that may be used to reduce the risks associated with energized work.
- ***Procedures for potential testing before and after lockout***

**F. Personal protective equipment**

- Review PPE - usage and applications. ***(eg. H.V. gloves, mats, hot sticks, testing devices, etc.)***

**G. Pre Job/Task Analysis**

- Switching plans

**2. Competency**

a) Where a worker possesses a valid ***journey person certificate in the power line trade by a Canadian jurisdiction*** this certificate shall be considered proof of training or;

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b) Where a qualified electrical worker does not hold a valid journey person certificate in the power line trade they shall demonstrate competency by:

- Attendance at a course in high voltage safety comprised of the course elements described above
- Achieving a passing grade of 70% on a written examination ***provided by the competent trainer***. The exam format shall be comprised of 50-60 multiple choice questions in a 90-minute time limit on relevant course content, or equivalent challenge, and a practical demonstration of skills required. ***(e.g., indoor rack out breaker / outdoor pull energized fuse)***

c) All ***workers that do not meet the requirements of s. 2(a)*** shall challenge the exam; however, where a qualified electrical worker can demonstrate their knowledge to the satisfaction of the ***competent trainer***, that person may accept the worker's previous training and experience as meeting the requirements of the practical/***classroom*** portion***(s)*** of the training program.

d) None of the above negates an employers duty to provide location specific training with respect to hazards, facilities or procedures as required by s. 19(a & b) of the regulations.

***e) Where an electrical worker has not worked on high-voltage systems/equipment for a period of three or more years, or where the design of the equipment worked on has changed significantly the employer or contractor shall evaluate, re-train and re-examine the worker to ensure their competency.***

**3. Approval of trainer:**

A competent trainer shall deliver the course and:

a. be a qualified electrical worker;
b. have a minimum of four years working experience with high voltage and;
c. have work experience and knowledge of all elements of the course.

**4. Documentation:**

The course deliverer shall provide each successful participant with written proof of successful training. ***(example provided)***

| **Certificate of Training - Employee Copy** | |
|---|---|
| Issued to: | |
| Has received approved training in high voltage electrical safety. | |
| Training Agency: | |
| Signature of worker | _____ |
| Signature of trainer | _____ |
| No#[1] | Date: |

**5. Duration:**

14-16 Hours, classroom and practical training combined.

[1] Trainer or training agency tracking number.