

	TITLE:	
	Technical Guideline	
	RECOMMENDED: E. Donkersteeg, P.Eng.	NO:
APPROVED: C. Malone, P.Eng.	ECG0002	1
REV. DATE: 2008-01-10		

**TECHNICAL GUIDELINE FOR
CUSTOMER OWNED
STANDBY GENERATION**

See Hydro Ottawa's Web site for the latest revision at: www.hydroottawa.com

REVISION SHEET

Revision	Description	Date	Initial
0	Original Document	2006-02-09	glw/csm
1	Section 6.2.1 Transfer Switch	2008-01-10	ed/csm

TABLE OF CONTENTS

PAGE

1.0	Introduction.....	4
2.0	References.....	4
3.0	Scope.....	4
4.0	Definitions.....	4
5.0	Safety	5
6.0	General Conditions	5
6.1	Customer Requirements.....	5
6.2	Standby Generation for voltages below 750V	6
6.3	Standby Generation for voltages above 750V	6
6.4	Installation Requirements	7
6.5	Restoration Times	7
6.6	Closed Transition Standby Generation	7
6.7	Planning Requirements	7

1.0 Introduction

This technical guideline along with the Ontario Electrical Safety Code and other applicable standards form the basis on which Hydro Ottawa Limited (HOL) will assess the safety of the proposed installation of customer owned standby generation within its electrical network.

Inadvertent interconnection of the standby source and HOL's electrical network may result in a major safety hazard. Privately owned standby generation shall not back feed power onto HOL's electrical network as it may jeopardize the integrity of HOL's network and result in damage to HOL's plant and/or third party equipment.

2.0 References

CSA 22.3 Part 1 - Electrical Code (CEC)
CSA C22.2 No. 178: Automatic Transfer Switches
CSA C22.2 No. 178.2: Requirements for Manually Operated Generator Transfer Panels
Hydro Ottawa ECS0012: Conditions of Service
Hydro Ottawa ECG0006: Embedded Generation Connection Guideline
Ontario Electrical Safety Code (OESC)
Ontario Energy Board: Distribution System Code (Appendix A – Conditions of Service)
Ontario Occupational Health and Safety Act

3.0 Scope

This technical guideline prescribes the general requirements for the design and installation of customer owned standby generators including the transfer switch equipment and/or generator transfer panel.

4.0 Definitions

- “Approved switch/panel” all electrical equipment must, by law, be approved by, and bear a certification mark of one of the accredited certification organizations labels affixed to the electrical equipment. HOL will only accept equipment bearing the certification mark from the following organizations: *Underwriters' Laboratories Inc.* (UL), *Underwriters' Laboratories of Canada* (ULC) and/or *Canadian Standards Association* (CSA).
- “Customer” means a customer of Hydro Ottawa Limited (HOL).
- “Closed Transition” switching that *momentarily* or *permanently* connects the standby generator to the distribution system by making parallel and then breaking parallel (i.e. make before break type transition).

“Open Transition”	switching that disconnects the load from the distribution system and then connects the load to the standby generator (i.e. break before make type transition).
“Standby Generation”	an electrical power source, such as a standby generator, intended for use when HOL’s supply is temporary unavailable.
“Transfer Switch”	a switching device for transferring one load connection from the normal HOL power source to the standby generation power source.

5.0 Safety

The design of a standby generation system shall be electrically isolated from HOL’s electrical distribution network during its operation. Standby generation sources that are not electrically isolated can back feed power, which can be transformed to higher voltages on the electrical network. This is very dangerous and could result in serious injury or death to anyone coming into contact with electric lines while working to restore power in an emergency.

When HOL supply is restored, the customer’s critical load is transferred from the standby generator to the HOL system. The generator shall not parallel due to phase and voltage differences and current short circuit values.

6.0 General Conditions

6.1 Customer Requirements

It is the customer’s responsibility, or its designated agent, to ensure that the generator does not feed power back onto HOL’s network. Rule 14-612 of the CEC, Protection and Control, requires that transfer switching between the regular and emergency standby power supplies must prevent the inadvertent interconnection of the normal and standby sources. This means that the transfer switch or generator transfer panel must be an open transfer system, and therefore disconnect the regular source before connecting the standby source during a power failure and vice versa when the power is restored.

Rule 6-106 of the CEC, Services and Service Equipment, stipulates that where a service is supplied by more than one system, the switching must be arranged to prevent systems from interconnection. The transfer-switching device will prevent damage to the customer’s generator once power is restored.

Customers wishing to use their standby generation source for load or peak shaving will require the installation of HOL monitoring equipment for system operation.

6.2 Standby Generation for voltages below 750V

6.2.1 Transfer Switch

The open transition transfer type switch shall be a double-throw with either a 3-pole, with solid neutral, or a 4-pole design. The approved transfer switch shall comply with the requirements of C22.2 No. 178.

For small single-phase services with the meter outside, the transfer switch shall be a 3-pole double throw switch for a grounded neutral generator and a 2-pole double throw switch for a “floating” neutral generator. All transfer systems shall be tested and inspected after installation, by a qualified electrician, for proper operation, (e.i. correct generator size and type, neutral grounding, utility power to meter when transferred to generator, and break before make operation). Hydro Ottawa will not be responsible for damage caused to the premise by the customer owned transfer switch and related equipment.

If the transfer switch is to be installed on the meter base, refer to Hydro Ottawa’s Metering Specification (document GCS0008) for sealing and metering requirements.

In accordance with rules 14-700 to 14-704 of the CEC, HOL prohibits the use of a solid-state switch as a disconnecting means.

6.2.2 Generator Transfer Panels

Should a generator transfer switch not be used for disconnection, the customer may install a generator transfer panel. The approved generator transfer panel shall comply with the requirements of C22.2 No. 178.2.

The transfer panel shall be clearly identified for standby use.

The transfer switch within the panel shall be either:

- An approved transfer switch described in Section 6.2.1, or
- Two independent approved switches, one for the normal source and one for the standby generator source, and equipped with a mechanical interlock mechanism to prevent simultaneous connection to both the normal and alternative supplies.
- The transfer panel shall be designed such that it will not allow for the upgrade of the transfer switching arrangement so that closed transition switching can be achieved.

6.3 Standby Generation for voltages above 750V

Customers wishing to install standby generation at voltages above 750 V shall notify HOL and submit designs for approval prior to installation. The transfer switch shall be

accessible to HOL staff for locking off purposes, in the event of work being done in the vicinity of the installation.

6.4 Installation Requirements

The standby generation installation shall comply with the requirements of clause 75-608 of the OESC. Customers installing standby generators should notify HOL should they require access to cabinets and/or switchboard compartments that are sealed off.

6.5 Restoration Times

When HOL supply is restored, the retransfer scheme shall wait for a minimum period of 10 minutes for the utility system to stabilize, before transferring from the standby generator to the normal supply.

The open transition transfer time between standby generator and utility source shall be greater than 100 milliseconds (6 cycles).

6.6 Closed Transition Standby Generation

Standby generation with installed closed transition switching or standby generator installations which are capable of closed transition switching, will be considered by HOL as embedded generation, and as such shall comply with the requirements of HOL document ECG0006: *Embedded Generation Connection Guideline*.

6.7 Planning Requirements

Customers wishing to install a standby generator with a capacity of greater than 100 kW should notify HOL of their intention prior to installation. This will be noted in HOL's records should work ever need to be performed in the area. In some instances, Hydro Ottawa may request an inspection of the installation.