

1.0 **GENERAL**

1.1 **Related UBC Guidelines**

- .1 Division 27, Section 27 05 05 Communication Rooms Design Guidelines – 2.6
- .2 Division 26, Section 26 51 00 Interior Building Lighting – 2.6

1.2 **Coordination Requirements**

- .1 UBC Facilities Electrical (Vancouver)
- .2 UBC Facilities Management (Okanagan)
- .3 UBC Information Technology

1.3 **Description**

- .1 Generator for emergency and stand-by power. Items with (Vancouver) or (Okanagan) only apply to the respective campus.

2.0 **MATERIALS AND DESIGN REQUIREMENTS**

2.1 **General Requirements**

- .1 Generators for emergency and stand-by power shall be installed in buildings as defined in .2 below.
- .2 If any of the following are included in building design, then a generator for emergency and standby power shall be installed within the building structure or in an enclosure on the building site.
 - .1 10,000 GSM or larger
 - .2 Active smoke control
 - .3 High Building as defined by the latest edition of BCBC
 - .4 Where defined by the Project Design Brief (i.e.: may be required for long-duration research equipment, critical infrastructure, freezer storage or animal care). Required non-life safety power shall be confirmed with user groups early on during the planning stage.
- .3 When a generator is installed, the following equipment shall be connected to the emergency/standby source.
 - .1 All active smoke control equipment and controls
 - .2 Fire Alarm Control Panel
 - .3 Emergency and exit lighting
 - .4 Heat Trace wiring
 - .5 Sprinkler system equipment (dry and pre-action system compressors, excess pressure and fire pumps, heating systems for water service rooms, etc.)
 - .6 Sanitary sump pumps and storm sump pumps
 - .7 Main electrical, communications and mechanical room lighting and least one convenience receptacle
- .4 If a generator is installed then all emergency power shall be supplied from it and battery packs shall not be used other than at the generator/transfer switch location to allow for breakdown maintenance.

- .5 In general, fume manifold and bio-hazard hoods should not be supplied from emergency power. Alternate proposals to supply fume and bio-hazard hoods from emergency power may be discussed with UBC Facilities Electrical (Vancouver) / Facilities Management (Okanagan).
- .6 In general, elevators not designated as “Elevator for Use by Firefighters” by the BC Building Code should not be powered from generators unless specifically required to be by the BC Building Code. Alternate proposals to supply non-designated elevators from emergency power may be discussed with UBC Facilities Electrical / Facilities Management (Okanagan).
- .7 Emergency generators shall be diesel fuel type only.
- .8 Emergency generators shall have a minimum 24-hour run time under 100% loading without refueling.
- .9 All generators shall be capable of being refuelled from ground level. The refuelling location shall be accessible for fuel trucks to park within 5 meters.
- .10 Confirm positive fuel prime to all fuel pumps as required.
- .11 See Section 25 05 00 Building Management Systems (BMS) Design Guidelines for requirements for BMS and Section 28 31 00 Fire Detection and Alarm for fire alarm system for generators.
- .12 In buildings where generators are installed a 5-20R receptacle supplied by a dedicated over current device shall be installed immediately below each panel that derives its supply from the emergency/standby distribution.
- .13 Standby loads may be connected to emergency power circuits provided that the addition of such equipment does not cause the total connected load to exceed 80% of the rated capacity of the emergency generator. The addition of loads with high in-rush current requirements may require the 80% maximum capacity limit to be lowered to maintain a reasonable margin of safety.
- .14 Overhead services for generators located exterior of the building is not [permitted](#).

2.2 Generator Housing and Location

- .1 Generators to be primarily located at ground level in separate enclosures.
- .2 Generators should be housed in areas which are large enough to allow for maintenance, testing and repair, and remove and replace components, without having to remove portions of the structure in which they are mounted.
- .3 The areas shall be insulated and heated so as to minimize maintenance on the units.
- .4 Generator rooms and transfer switch locations shall be provided with an emergency battery lighting pack for breakdown safety and maintenance on the units.
- .5 Sound Attenuation: Generators housings shall be Level III (68 to 70dBA)

2.3 Equipment Type

- .1 All generators shall be supplied with remote generator annunciator mounted at transfer switch location.
- .2 Generators shall be sourced from original equipment suppliers so that parts are readily available and locally supplied and supported [within a 100km radius](#).
- .3 [The following are approved manufacturers:](#)
 1. [Cummins](#)
 2. [Finning/CAT](#)
 3. [Blue Star](#)
 4. [Simmax](#)
 5. [Generac](#)

[System shall be compatible with existing UBC operating control systems.](#)

2.4 Loadbank Requirements

- .1 To assist with maintenance, generators shall have a second circuit breaker rated for 100% load on the generator output prior to the transfer switch. This is for tying in load banks for annual testing without disturbing cables and lugs of normal loads, as per CSA C282-05 B18. [The load bank breaker shall have a shunt trip that will activate upon operation of the transfer switch](#). The output of the second breaker shall extend to a 3R outdoor-rated Cam-Lok 1016E female connection box mounted on the generator enclosure or in an accessible location exterior to the building envelope.

2.5 Generator Transfer Switches

- .1 Automatic Transfer Switches (ATS) shall be supplied with fully rated double-bypass isolation capability.
- .2 Transfer Switch Type:
 - .1 (Vancouver): Unless requested, all transfer switches shall be Open transition type.
 - .2 (Okanagan): Unless requested, all transfer switches shall be Closed transition type.
- .3 The entire ATS & bypass assembly shall be certified to CSA C22.2 No. 178.
- .4 ATS shall have a minimum 18 cycle Withstand and Close-on Rating on all equipment rated at 400 amps and greater.
- .5 ATS bypass/isolation handles shall be permanently attached & require a maximum of two steps to perform bypass/isolation operation.
- .6 ATS main contacts and bypass contacts shall be fully withdrawable on equipment rated at 400 amps and greater.
- .7 All components within the ATS shall be supplied, commissioned and supported by the ATS provider.
- .8 Closed Transition Transfer Switch Requirements:
 - .1 Closed Transition Transfer Switches (CTTS) shall include a separate redundant protection relay to prevent any possible back feed to the utility. (Vancouver) All methods of providing this form of protection shall be submitted to UBC Energy & Water Services for approval prior to equipment installation. (Okanagan) UBC Okanagan must coordinate and receive approval from Fortis BC prior to finalizing CTTS specifications.

- .2 CTTS redundant backfeed protection may be a reverse power relay set not more than 5% of the generator rating and extended parallel relay set at not more than 1 Second.
- .9 Transfer switches shall be motorized or solenoid contact type.
- .10 Consultant recommended programmable settings shall be reviewed with UBC as left condition.

2.6 Fuel Tanks

- .1 All diesel fuel tanks shall be above ground and double walled unless a single walled tank is contained by a separate containment tank, for example, a day tank.
- .2 Underground tanks that are inherited with their piping systems shall be removed as part of any replacement.
- .3 Fuel storage tanks shall be protected from freezing.

2.7 Maintenance Manuals

- .1 At least two complete sets of manuals, (these shall include operators, owners, troubleshooting, full repair manuals as well as any disks and software diagnostics), shall go to the shop level before sign off and acceptance of units. One digital copy is required.
- .2 A complete set of manuals for each Transfer Switch shall be provided. The manuals shall include all schematics and wiring diagrams for actual supplied components and commissioning report. Generic manuals will not be accepted.

2.8 Central Inverter Systems

- 1. For buildings 2,500 GSM to 10,000 GSM a Central Inverter System shall be provided to supply all BCBC required exit signs and egress lighting.
- 2. A single piece of Unit Equipment shall be installed at each Central Inverter System location.
- 3. Total loading shall not exceed 60% of system capacity as calculated for BCBC requirements.
- 4. The Central Inverter System shall be [capable of connecting](#) to the BMS system for monitoring of all inverter alarms [using dry contacts](#).
- 5. [Approved manufacturer is Ready-Lite or approved equal](#).

END OF SECTION