

## DIVISION 16 - ELECTRICAL

### Section 16620 - Standby Power Generator Systems

#### Introduction

The design for emergency power generation takes on two separate designs at this campus. For the typical building at the main campus it is generally used only to provide power to emergency lighting and similar building maintenance type pieces of equipment. In some other buildings additional loads are added for such things as freezers or other types of mechanical equipment which need to be on due to worry about losses of expensive equipment (including some valuable experiments) which are stored in the freezers. However the design for expansions on the AHSC campus sometimes take on a different flavor since it may include areas which could someday become part of the hospital. For this reason it will be necessary to discuss in great detail the design of the emergency generation system with the Engineer, prior to the proposal of the system. As a part of the design the following items should be taken into account:

- In general we *require* the use of Natural Gas to fuel the generators due to *local emissions requirements and ordinances*, ease of delivery of the fuel *and elimination of the need for fuel* storage. With the constant construction around this campus, areas which were once very accessible for delivery of fuel are now very difficult to access. In addition the designer should verify that the source of natural gas which has been designed for the building is adequate for the additional volume of natural gas that will be required during the full load operation of the generator.
- Make sure that the generator will be adequately cooled in case of loss of power to the general building system. It may be necessary to provide additional capacity for the generator just to cover an additional fan coil unit to provide cooling to the generator room if it is located inside of a closed room in the building.
- Provide for adequate exhaust from the building in a location where the fumes will not be sucked into the building air conditioning system during normal or emergency conditions.

In addition it may be decided that some of the emergency generator systems will in the future be used for peak shedding. For this reason it is important that the generator provided be of a top brand of manufacture and designed for more than just an occasional run emergency operation. Engine generators shall be site tested for rated output plus 10% for 1 continuous hour, connected for temperature, based on capability to operate continuously at 115°C ambient. (Refer to base specification.)

As a part of the design development documents, provide a load calculation which is used for providing the basis for the sizing of the emergency generator. Take into account that at least 30% spare capacity shall be provided for in the design of the emergency generator.

As part of the plans design make sure that the required circuits for the battery charger and the engine oil and manifold heaters are shown and provided.

Remote control or annunciation panels shall be shown on the drawings with all wiring required. Show ATS (automatic transfer switch) and all associated wiring on the plans. Fire alarm shall monitor generator run and report to Fire Safety Shop *thru the FACP*.

For your use a copy of an existing specification for an emergency generator specification and an automatic transfer switch have been provided. (See attached appendix specification sections 16620 and 16622). As a minimum all of the areas covered in this specification should be covered. This specification can be provided on disk for your use, however it is still the responsibility of the engineer to provide a complete specification for this design.

Where a building EMCS system is available connect the following items to the system. Building power off, generator power on, generator alarm (a common alarm of all generator alarm functions).

### **Part 1 - General**

- Provide complete submittals on the emergency generator, including at least 4 copies of all operations and maintenance manuals. Submittal information shall include documentation of fuel efficiency based on a KW per pound of gas. This should be provided for evaluation by the engineer prior to approving the use of any brand of emergency generator set.

### **Part 2 - Products**

- The generator should be the product of top quality generator manufacturers such as Caterpillar or Waukesha. Other manufacturers may be considered based on submittal information. The manufacturer should certify that the generator is capable of providing the necessary power for all of the load as designed, including the spare capacity.
- *Engine Generator System shall have a 5 year extended warranty. Whenever the transfer switch manufacturer offers an extended warranty, it shall be included,*
- *The contractor shall provide (2) complete sets of parts and repair manuals for all engine, generator and transfer switch systems and components.*

### **Part 3 - Execution**

- The generator shall be mounted on a housekeeping pad and if in a building shall have a containment area built around to contain any oil or antifreeze spills. The generator shall be installed and connected to meet with the requirements of the manufacturer.
- Provide a resistive load bank test of all generators prior to acceptance. Minimum tests should show all required control options of the generator and transfer switch as well as a one hour load bank test at 80% load and an additional one hour load bank test at 110% load, corrected for temperature of 115° C. Generator shall also be tested in a full load live situation test prior to acceptance.

### **End of Section 16620**