SANTA BARBARA COUNTY APCD
DIESEL ENGINE ATCM FAQ #2 (ver 1.0)

1. *How do I determine the rated-horsepower (hp) of my generator engine if all I know is the rated kW value?*

There are two types of kW numbers. One is called the mechanical kW (kW_m) and the other is the electrical kW (kW_e). Engine manufacturers and generator suppliers do not always state which one they are using and this can lead to confusion in determining the rated horsepower (hp) of the IC engine. The kW_m is the mechanical power driving the generator. It is determined by multiplying the rated horsepower of the engine by the conversion factor of 0.7457 (1 hp = 0.7457 kW_m). The electrical kW_e is the actual useful power available to the end user and takes into account power losses due to the efficiency of the generator as well as fan power needs. These losses are engine specific, and 15-20 percent efficiency loss is not uncommon. As a result of accounting for the efficiency loss, the kW_e value is always less than that of the kW_m. Common kW_e values can range from 80-85 percent of the kW_m value. Older generators are often less efficient than newer models and therefore would be closer to the 80 percent end of the range.

Example:

A Generac SD030 standby generator is rated at 30 kW_e by Generac. This generator is powered by a Deere 4024T diesel engine. The rated horsepower of the Deere engine in standby operations is 48 hp (with a 36 kW_m rating). If the only generator information available was the 30 kW_e rating, the engine's hp could be estimated by:

Est. engine hp = (rated kWe) * (1/efficiency) * (hp/0.7457 kW_m)
= (30 kW_e) * (1/0.84) * (hp/0.7457 kW_m)
= 48 hp

In this case, the engine is new; therefore a higher efficiency (i.e., lower power loss) is assumed. This estimation calculation is only required if the engine specific data is not available.