CONNECTICUT RESOURCES RECOVERY AUTHORITY
CONNECTICUT'S RECYCLING LEADER

BACKGROUNDER

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The Facts about CRRA's Peaking Power Plant

CRRA owns a peaking power plant which is adjacent to the Mid-Connecticut Project trash-to-energy facility in Hartford's South Meadows.

The peaking plant consists of four electric generator sets, each capable of producing 40 megawatts (MW) of electricity. Each generator set consists of two Pratt & Whitney FT4A-9 jet engines typically used for aircraft applications on Boeing 707 and B-52 aircraft. The FT4A-9s run on jet fuel.

As opposed to base-load power plants that run continuously, peaking power plants are only run when demand for electricity nears its peak – hence the term "peaking plant." As demand increases, the Independent System Opeerator-New England (ISO-NE), which operates the regional power grid, brings peaking units online.

ISO-NE – not CRRA – determines when to activate the peaking units and for how long.

Recently, ISO activated this peaking plant on Sept. 2 and Sept. 4 to meet an unusually high demand for power. The "jets," as they are known, ran for about three and a half hours at a time. Although the jets have the ability to run around the clock, in the past few years they have averaged about 12 to 18 hours of service per year.

Hartford's peaking plant went into commercial operation on June 1, 1970. CRRA acquired the plant in 2001 from Connecticut Light & Power (CL&P) after legislation restructuring Connecticut's electric utility industry required CL&P to sell its generation assets. At the same time, CRRA acquired the electric generating portion of the adjacent trash-to-energy plant.

The jets produce hot exhaust gas that is converted to electrical energy by a power turbine (not coupled to the jets) and an electric air-cooled generator. The power turbines and the generators operate at 3,600 rpm and produce electricity at 60 hertz (cycles per second). Each generator has an enclosed control area that houses the main control cabinet, breakers, motor control centers, vibration monitoring equipment, programmable logic control cabinet and monitor, and a battery back-up power supply with direct current to alternating current power inverters.

Two 3-winding, main power transformers, each rated at 87 Mega Var-Ampheres (MVA), serve to raise the generator voltage from 13.8 kilovolts (kV) to a transmission system voltage of 115 kV. Each main power transformer is commonly connected to two of the four generators.

A 5 million-gallon jet fuel storage tank is adjacent to the peaking plant and the site includes a common maintenance shop and office building. The tank was installed in 1945 and needs to be replaced, so starting in the fall of 2010 CRRA will remove the existing fuel tank and replace it with a 550,000-gallon tank – almost 90 percent smaller – which ISO agreed will be sufficient for the peaking plant's limited hours of operation.

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The plant is staffed by two employees of Northeast Generation Services (NGS) under contract with CRRA to meet operational and maintenance needs.

The peaking plant's engines have an historic annual operating availability of 85 to 90 percent and a capacity factor of 0.5 to 2.0 percent.

The peaking plant is activated remotely by the Connecticut Valley Electric Exchange and can reach the maximum wattage of 160 MW in less than 15 minutes.

The peaking plant also has "black-start capability," which means it can turn on without an outside power source, much like the engine of a car. In the event of a shutdown of the power grid, plants with black-start capability are needed to reactivate the grid.

For the peaking plant's black-start capability and generating capacity, CRRA receives about $6 million per year – revenue that holds down trash disposal fees – simply for keeping the peaking plant ready and available.

Although the peaking plant is less efficient than the units at base-load power plants, the peaking plant operates only a few hours per year. The peaking plant is operated in full compliance with all applicable permits, orders and regulations, including a Title V Air Operating Permit issued by the Connecticut Department of Environmental Protection. DEP has issued CRRA a trading order, allowing it to buy credits to offset any exceedances of emissions limits.

DEP has also ordered CRRA to determine the steps necessary to bring the peaking plant into compliance with emissions regulations and the costs of those steps. A report is due in 2011.

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