

American Ref-Fuel Saves Time and Money by Partnering with GE

Challenge

American Ref-Fuel located in Chester, PA, just south of Philadelphia, burns 3,300 tons of trash each day to heat a boiler that produces 140,000 lbs/hour (63,504 kg/hour) of steam at 690 psia and 800°F (427°C). The steam feeds to a condensing type turbine-generator to produce 75 megawatts of electricity that is sold to the Atlantic City Electric Company.

Boilers operate at such high temperatures and pressures that treating the water prior to the boiler remains critical to its operation. The presence of inorganic materials in the water often form scale on the boiler. As this scale builds, it reduces the overall efficiency of the power plant. With increased wall thickness from scale, less heat transfers to the boiler and water. That means less electricity is generated per ton of trash burned.

American Ref-Fuel had been using two demineralizers to treat the water prior to the boilers. The throughput was about 120,000 gallons (454 m³) of water before the demineralizer would have to be regenerated – a process that occurred every 22 hours. The cost of chemicals to regenerate the demineralizers was US\$1.75 per 1000 gallons (3.8 m³) of boiler feedwater.

Solution

American Ref-Fuel partnered with GE Water & Process Technologies to update the boiler water treatment system, decrease maintenance time and reduce the operating costs of generating electricity from trash.

The GE solution was to install sand filters and a PRO 200 reverse osmosis system prior to the demineralizers. This equipment reduced the TDS going to the demineralizers by 98%.



Figure 1: PRO 200 RO System

Results

Now, the throughput of the demineralizers is about 1.7 million gallons of water before the demineralizer has to be regenerated. The combined chemical cost for RO and demineralizers is US\$0.63 per 1000 gallons (3.8 m³) of boiler feedwater – a 93% savings! American Ref-Fuel also saves time, as the demineralizers only need to regenerate about every two weeks instead of every day. Additional benefits include:

- Safer work environment with reduced caustic chemical usage
- Lower maintenance costs with fewer regenerations
- Less concentrated wastewater to impact environment
- Increased capacity to match higher demand periods i.e.; boiler cleaning or tube leaks.
- Greater timeframe between regenerations for maintenance of the demineralizers



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CS1026EN 0602