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PINELLAS COUNTY RESOURCE RECOVERY FACILITY CAPITAL REPLACEMENT PROJECT One Year Of Improved MSW Throughput And Electrical Generation

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INTRODUCTION

In May of 2003, the 3,150 TPD Pinellas County Resource Recovery Facility (PCRRF), the largest waste-to-energy plant in the United States, reached its 20-year milestone. The PCRRF is located in St. Petersburg, Florida, on a 705 acre (1.1 square mile) site owned by Pinellas County and known as "Bridgeway Acres". The PCRRF has been owned by Pinellas County, operated by Wheelabrator Pinellas, Inc. (WPI) and monitored by HDR Engineering, Inc. since its inception. In addition to the PCRRF, the County operates both Class I and Class III landfills on the site.

In 2000, following a successful 4-year Air Pollution Control (APC) Retrofit Project, the County embarked on a major facility upgrade, entitled "Capital Replacement Project" (CRP), in order to renew certain critical and aging equipment, maximize the operating performance and prepare the facility for a new operating contract upon the current contract's expiration in May, 2007. The main component of the CRP was the redesign and rebuilding of each of the three 1,050 TPD boilers. This was done during 16-week periods, September through December, in 2001 (Unit 2), 2002 (Unit 1), and 2003 (Unit 3). Acceptance tests were performed during the January following completion of each boiler, and the final acceptance test was certified by Pinellas County in February, 2004. This paper reviews the scope of work for the CRP, acceptance test results, and operational statistics for pre and post CRP periods.

Project History

Two boilers (Units 1 and 2) and a 50 MW turbine generator (T/G 1), along with all ancillary equipment, commenced operation in 1983. In 1986, a third boiler (Unit 3) and a 25 MW turbine (T/G 2) became operational. All boiler units were designed to produce superheated steam to the T/Gs at 615 psig and 750°F. However, after 13 to 16 years of operation, the boilers required frequent cleaning due to gas-side fouling and severe corrosion caused by the high

temperatures. Also, high economizer gas exit temperatures and off-design superheater outlet temperatures resulted in loss of turbine efficiency and generator capacity. Thus, there was an obvious need to redesign and reconstruct the boilers in order to ensure reliable facility operation beyond 20 years.

The Agreement between Pinellas County Utilities with Progress Energy Florida (PEF) for power purchase has a significant capacity component as well as an energy component. The Agreement requires the continuous maintenance of a monthly rolling average capacity factor equal to 70% of the declared capacity of 54.75 MW. During some prior periods of lower facility availability, the capacity margin was below desired levels, although it never reached the 70% threshold. The CRP implementation was spread out over a 3-year period in part to coincide with available curtailment windows from PEF.

CRP Scope of Work

Two-thirds of the \$56.5 million CRP cost was devoted to reconstruction of the boilers, from the furnace gas exit to the economizer gas exit. (See Figure 1) The remaining expenditures were for the following activities:

- Replacement of two electric-driven boiler feedwater pumps (BFPs), rebuilding of the existing pump and installation of the overhauled BFPs in the steam drive (standby) positions.
- Complete rebuilding of three refuse cranes, including increased rating from 11 tons to 15 tons.
- Replacement of numerous components of the five-cell cooling tower, including selective replacement of damaged fill in all cells, new drift eliminators in three cells, replacement of mechanical equipment, fan deck, hot water distribution boxes and risers, and selected replacement of deteriorated structural framing.