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City of Tampa, McKay Bay Retrofit; Before and After

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History

The City of Tampa's solution to solving their waste disposal problems started almost 30 years ago. A conventional refractory lined incinerator equipped with a wet quench scrubber was constructed and operated by the City, starting in 1965. The old incinerator would often belch black soot and smoke and in 1979 was shutdown for environmental concerns. The City selected Waste Management Energy Systems, then a subsidiary of Waste Management Inc., to design, build, and operate for 20 years, a tried and proven waste combustor linked with a heat recovery boiler, electrostatic precipitator, and a turbine generator. This system was placed into operation in 1985 and the last two units were operated until July 2000 when compliance with the Clean Air Act required their retrofit. In 1996, the City assembled a Project Team consisting of consultants that specialized in various aspects of solid waste disposal including: permitting, design, operations, and construction oversight. After several years of design, procurement, and negotiations, Wheelabrator was selected as the successful vendor to design, construct, and operate the retrofitted facility. Construction began in April 1999 and went into commercial operation in January 2002.

Design Criteria

There were several key items developed during the procurement process to make this a successful project. The primary concern was to not only meet the new emission limits, but also to maximize steam utilization within the existing power generation system and to provide a dependable waste combustion/steam generation system. This paper will focus on some of the key elements relative to the furnace/boiler design to reduce erosion and corrosion of the boiler tubes and reduce fouling. The key items were:

1. Establish maximum flue gas velocity limit of 20 feet per second in all gas paths at 110% maximum continuous rating under fouled conditions.
2. Set the maximum flue gas temperature entering the superheater as 1250 degF.
3. Specify minimum materials of construction i.e. alloy grates, high chrome superheater tubes, refractory materials, abrasion resistant plating, etc.
4. Increase minimum corrosion allowances 1/16 th (.061) inch above the minimum ASME requirement.
5. Conduct design review stages including cold flow modeling of furnace/boiler between the owner, designer, constructor, and operator. During the cold modeling test, several areas were identified that would cause high erosion. This resulting in the addition of chevrons and deflection vanes in the boiler passes.
6. Established access and inspection requirements. By specifying the number and location of access and inspection doors, it is possible to readily clean and inspect the boiler tubes and ash hoppers.