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York Resource Recovery Center Control System Upgrade

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Introduction

The York Resource Recovery Center was constructed and completed for the York County Solid Waste and Refuse Authority by Westinghouse Electric Corporation in October 1989. The design incorporated three Westinghouse O'Connor Rotary Combustors fitted with Deltak Boilers to provide a state-of-the art incineration system for the 400,000 residents of York County. Westinghouse incorporated many of their industrial products into the plant including their Westinghouse Data Processing Family Control System (WDPF) for control of the plant combustion and generation process.

The WDPF Control System served the plant needs well from start-up in 1989 until the present requiring only software revisions to maintain its performance.

The original plant computer system was comprised of five distributive processing units (DPU's) and a series of remote mounted Westinghouse Numalogic Serial Interface Units installed and linked via a dual coaxial communication interface.

The Numalogic Serial Interface Units (SIU's) expanded the capability of the five distributive processing units without adding additional panels to the architecture of the plant's control room. Field wiring between the WDPF and the SIU Input / Output remote panels were preassembled at the factory to reduce the probability of wiring and termination errors and ease the cost and time of installation.

Westinghouse used the Remote Input / Outputs to expand the capabilities of the WDPF System and keep the plant's construction cost lower by using the less expensive SIU's. In addition to the 5 redundant DPU Panels, the control room housed the main control board, two electrical switchboard panels for the plant substation, an auxiliary panel for boiler and emissions equipment, an air conditioning unit, and a small office for shift supervisory personnel.

The Remote Numalogic SIU's were placed in the motor control centers of the three boiler units, the turbine generator, the cooling tower, the Air Pollution Controls, and the Continuous Emissions Monitoring System (CEMS).

Westinghouse Electric Corporation experienced a series of business divestitures during the 1990's that impacted the York Resource Recovery Center in two ways. Westinghouse sold many of its core industrial businesses.

The Westinghouse Process Control Division, the manufacturing division that manufactured and provided technical support of the WDPF Control System, was sold to Emerson.

Westinghouse also excited the waste-to-energy business by selling its operation and maintenance contracts for the four plants it owned and /or operated. The York Resource Recovery Center was

one of three of those O&M contracts assumed by Montenay Power Corporation.

Shortly after Montenay began operating the York Resource Recovery Center, Emerson notified the new operator that the WDPF computer control equipment was on a short time line for obsolescence. This meant that technical support as well as spare parts availability would soon stop. To further complicate things at the Center, another company that purchased the Westinghouse Numalogic Programmable Control line of products dropped the line from manufacture and support as well.

Control System Upgrade Options

Montenay York and its customer, the York Solid Waste Authority, were faced with the decision to upgrade or replace the control system. Montenay Power, operates two other WTE plants with similar WDPF Control Systems.

The YRRC and the SERRF Plant (Long Beach, CA) had an immediate need to upgrade or replace their WDPF control systems. A third plant, the Bay County Plant (Panama City, FL) had completed a successful migration from the WDPF System to the new Emerson Ovation System before its transition to Montenay Power. The migration from the WDPF to the Emerson Ovation was an option for the York and SERRF Plants.

The Montenay operated Dutchess County Plant (Poughkeepsie, NY) was also evaluating the installation of a new control system and was also evaluating the use of the Emerson Ovation System as a possible replacement of their module type control system. They had a need for better historical data retrieval and overall control performance.

Both the York and the Long Beach Plant had recent proposals from Emerson who proposed to upgrade the existing WDPF Systems to their Ovation line. Another vendor, Rockwell, provided quotes for a complete replacement control system.

Montenay York Staff and members of the York County Solid Waste Refuse Authority Staff visited the Emerson factory and training center near Pittsburgh in June 2002. Our Senior Instrument and Controls Technician who led our project visited a trade show in Los Angeles, California that featured the proposed Rockwell Control System that was an alternative to our WDPF.

The options of upgrading the existing system or replacing it were seriously evaluated and considered. Both options contained certain obstacles and benefits for our plant.

Several factors related to our municipal waste and air quality operating permits, the contractual and economics contained in the agreement between the York Authority and Montenay, and the plant's historical processing record of not bypassing waste were issues that also had to be considered prior to upgrading or replacing the plant's control system.

Our state air quality permit allows the Facility's boilers to be out-of-service for 72 continuous hours before contingency plans to bypass waste and find proper disposal of stored waste begins. At 120 hours, waste must be removed from the plant to a proper disposal site. The Authority and Montenay agreed that stopping waste, removing waste, or approaching the state's department of environmental protection for a waiver were not desirable solutions even though we both believed that an exception might be granted based on the environmental record of the Facility.

In-county waste has never been diverted or bypassed to a landfill or alternative site since the plant began operation in October 1989. We did not want an extended outage to replace or upgrade the control system that might terminate this operational record. Alternative disposal was not economical for either party.

Evaluating Control System Options

The option of replacement was further examined with the thought that an entire system could be purchased and installed parallel to the existing system. The operating program could be somewhat field tested prior to connecting the field wiring. This option would require a lengthier period of downtime since more overall field work would be required and extensive retesting of circuits would have to be completed to insure a safe restart. The proposal for a replacement system did offer the benefit of initial savings in cost but when further examined several issues were raised:

1. A replacement system would require 100% instrument loop tests as well as 100% plant system functional tests similar to a new plant start-up