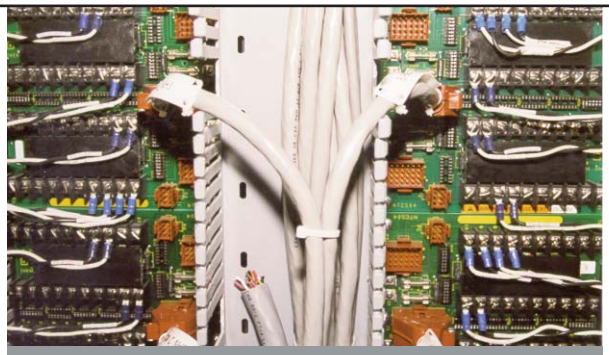
Montenay Waste-To-Energy Plant Migrates Control System for Integrated Regulatory, Business Management

RESULTS

- Reduced wiring cost
- Reduced downtime
- Improved documentation
- Improved Information Flow



APPLICATION

Solid waste burning

CUSTOMER

Montenay Inc., is a subsidiary of French company Vivendi, operating the Greater Vancouver Regional District's (GVRD) Burnaby facility in, Burnaby, British Columbia, Canada. Montenay operates eight such waste-to-energy facilities in North America, and employs some 240,000 worldwide. In the paragraphs below, Montenay Burnaby facility plant manager Ron Richter describes the waste-burning process, and the control system migration he oversaw under crucial delivery, change-out, commissioning and startup scheduling.

This plant, with 40 employees, processes approximately 250,000 metric tons per year of municipal solid waste on a mass-burned basis. The plant produces steam, which it sells to the adjacent recycled paper mill, Crown Packaging, Limited. Crown uses about 50% of the incinerator's available steam. Montenay condenses the rest while seeking markets for the remaining 50%.

The Burnaby plant operates along classic boiler operation patterns. Each of three boilers, operating at over 1000 degrees Celsius, burns about ten tons of residential and light commercial waste per hour, or about 700 tons a day.

As North America's population and affluence increase, so do its energy needs, and the amount of waste it produces. When you're in the business of turning waste into energy, you learn a lot about what's in our garbage. For instance, seasonal high mercury levels in Vancouver area waste doesn't come from area industries. Rather, it's absorbed by the local vegetation from the earth—a natural by-product of volcanic eruptions that formed the land mass. On the other hand, the increasing

"I think the biggest benefit the Montenay Burnaby plant made with this migration is the implementation of a system that can take us into the next ten or twenty years, with the ability to expand with the facility. We're confident that this system will be a major advantage in any future developments."

Ron Richter

Plant Manager, Greater Vancouver Regional District, Burnaby Waste Incineration Plant

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quantities of lead in the plant's waste come from an ever-growing quantity of aged, discarded computer monitors and CPU's.

Garbage is big business, and waste incineration plants like the GVRD Burnaby facility are among the most closely monitored and regulated businesses on the continent.

The heat generated from the burning waste, and the flue gas is drawn through a combustion chamber with an induced draft fan on its back side. The gasses pass out of the steam generator into the super heater section, and then into an economizer, which uses the heated gas to preheat water that will go into the steam drum. From there the products of combustion are sent into a conditioning tower that cools them using water injection.

A second tower introduces a very fine hydrated lime and activated carbon. The lime and activated carbon scrub flue gasses of the various pollutants generated during the garbage combustion. The reacted lime and carbon, together with fly ash, is collected in a fabric filter and conveyed to a fly ash silo. The combination of these three units comprises about 40% of the plant's construction cost, and they represent the plant's major consumables cost. The stack gas is continuously monitored for oxygen level, carbon monoxide, nitrogen oxides, sulfur dioxide, total hydrocarbons and opacity. The test results are sent to government environmental control agencies.

CHALLENGE

Montenay wanted to update its existing control system. In a business that is so closely monitored for environmental compliance, any inaccuracies in time and date stamping of historical emissions reports could create huge headaches. This prompted an investigation into new technologies. Montenay weighed minimal upgrades against a more comprehensive change-out of the 1985-era technology. Maintaining, replacing and repairing, inventorying, supporting and upgrading the dated system could become increasingly costly. In addition to cost considerations, Montenay looked for a state-of-the-art system with all of today's technological advances, as well as a proven track record, expandability, and an open path to future control developments.

A key concern in making the change-out was whether the manufacturer and local control firm could change out an entire distributed control system and keep the control rock-solid reliable. The most critical issue was downtime. As a major component in the solid waste management system for the lower mainland of British Columbia, they couldn't afford to be down for a week or two. So timely delivery, scheduling, change-out, commissioning and startup were crucial.

SOLUTION

Montenay selected Emerson Process Management's DeltaV™ digital automation system, with local sales, engineering and support from NORPAC Controls Ltd. Montenay and GVRD shared the capital investment. Our plant operators and management team felt that the

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system best represented the way Montenay wanted to computerize control of the facility with emphasis on the intelligence and software sides of the process control, rather than focusing on dedicated hardware. Montenay Burnaby envisioned the system moving toward the convergence of elements like the DCS, and Montenay's own office network operating system—opening a number of local and wide are network integration possibilities.

Reduced wiring cost
To minimize downtime during the change-out, and to reduce re-wiring expense while installing the new control system, NORPAC left all the original system's termination panels in place. The engineering team picked the field signals directly from the existing systems field wiring termination panels. The signals were taken to the new system as a raw signal by utilizing the configurable nature of the existing DCS manufacturer's field termination boards. A series of DIP Shunts were reprogrammed to provide a pass-through function on the termination board. This removed all components such as resistors, filters, and fuses from service on the old termination boards.

Reduced downtime
NORPAC engineers created a multi-pair cable with a new connector to mate with the old system's termination panel. This new cable was pre-wired into the DeltaV system. This reduced the number of terminations at change-over time from thirty-two to one. With this methodology, NORPAC and Montenay were able to change over the field wiring for each boiler in about 5 hours. NORPAC's Steve Priest notes, "If we'd had to re-wire each of 1100 I/O, points in the field, it could have easily taken twenty times that long. Essentially, we took a process involving 4 wire terminations per point, equaling about 352 man-hours or 30 days' rewiring—and reduced it to 48 hours, an 86% reduction in both time and installation expense."

Every pair of wires was loop-checked after the conversion before placing the unit back in service. This migration method not only reduced wiring time, it also reduced the chances for wiring errors and associated trouble-shooting time. Working the downtime scheduling into routine annual boiler maintenance and shutting down one boiler at a time, the plant's total combined downtime for the three boilers was 216 hours. Each hour represented tenths of a percent of budget, because waste during shutdown had to go somewhere else for disposal like to a landfill, which GVRD had to pay for. The plant also was not getting steam to the paper mill, and so was losing that income.

Improved, integrated documentation
A lot of time at the Burnaby plant is spent in documentation. The continuous emissions monitoring system (CEMS) in particular, is our biggest integration. Under the old system, we received paper copy from CEMS's environmental data acquisition system. Operations wrestled with that information for many man-hours each month for

environmental reporting. With the new system, that environmental report is available to us in Excel spreadsheets. The data for the Excel spreadsheet is populated through the system's integration onto the plant's local area network.

GVRD is responsible to compile and send monthly operating reports on the facility to the Provincial Ministry of Environment. GVRD staff can now dial up and view current plant operating data, including boiler overview graphics, on their desktop computers. They also have access to the same Excel spreadsheets and status reports we produce at Montenay operations.

The big advantage we've gained from the DeltaV system has been the ability to cut and paste back and forth out of Excel for use in our reports. Right now, we e-mail those reports to our head office in New York. We're confident that the DeltaV system can produce that information in New York over our Intranet in real time, which will produce further administrative time and labor savings.

Improved information flow

Several months ago, our Excel reports pointed to a four-hour incident in which an operating parameter was out of control range. A quick look through the trends for the time in question showed the inconsistencies, which turned out to be a measurement failure, rather than a control problem. We did all that analysis in five minutes, pinpointing a point in time two or three months prior. This analysis could have easily taken a couple of days under the old paper copies and multiple recording systems.

Looking to the future

We intend to continue integrating plant information into the office LAN. We are confident that we will see savings in utilizing the plant from the improved view of the operating conditions.

The small footprint of the DeltaV control system saves us a lot in installation costs alone. It's going to make viable some projects that were marginal before. Other possibilities for future expansion include advanced control. We had been using a stand-alone system running a Neural network technology to optimize flue gas scrubbing. We plan to pull that into the DeltaV system with its advanced control packages for environmental control of pollutants. If we can better control the amount of lime that we put into the system, it will reduce many tasks that we do, and it will reduce our consumables costs. As we upgrade the emissions monitoring equipment here, the DeltaV system will be a fundamental part of the implementation.

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