Success Story

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CENTUM CS 3000 Replaces Legacy System at Paris's Largest Waste to Energy Plant

TIRU SA

Location: Saint-Ouen, Paris, France
Order date: 2004
Completion: October 2007
Industry: WTE, Renewable Energy

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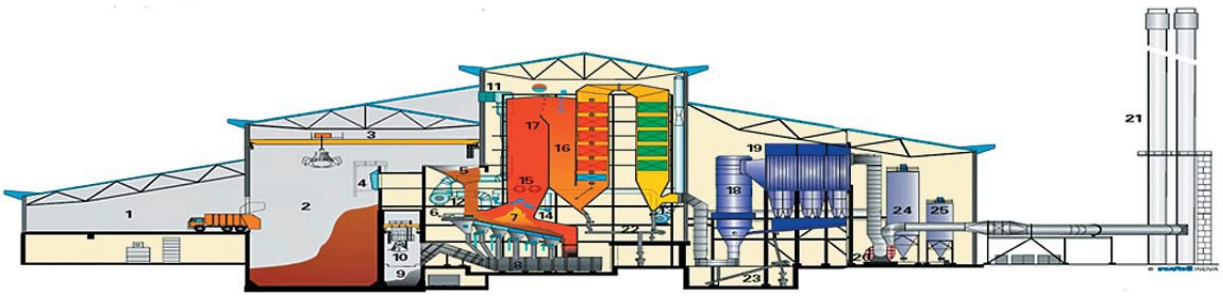
Executive Summary

The Syndicat Intercommunal de Traitement des Ordures Menageres (SYCTOM) owns waste sorting and transfer centers and municipal waste landfills in the Paris metropolitan area. SYCTOM treats close to 2.8 millions tons of waste each year for 89 municipal councils in five administrative districts (departments). It has organized its activities with many partners, established a network of plants, and invested in sorting facilities and processing centers that are as close as possible to the sources of waste. Since its founding in 1984, the company has based its processing of household waste on the principle of sustainable development and low cost of ownership.

TIRU SA is one of the largest European-based plant operators in the household waste management and energy recovery sector. The company operates 20 plants in France, Canada, and Great Britain, including the SYCTOM Saint-Ouen waste to energy (WTE) plant in Paris. Built in 1990, this facility is equipped with three CNIM incinerators with a thermal output of 65 MW each. The plant has the capacity to treat 650,000 tons per year of household waste and produces 1,300 GWh of steam per year at 40 bars and 380 deg C. Of this steam, 95% goes to the district heating company, Compagnie de Chauffage Urbain (CPCU), which operates the world's largest steam network. The remaining 5% is converted into electricity by a steam turbine (10 MW) for use mainly in this plant.

Yokogawa France replaced this plant's legacy system with a CENTUM CS 3000 distributed control system (DCS). This system includes 20 field control stations (FCS) that control the operation of the incinerator, boilers, wastewater chemical treatment, and other processes with a combined total of more than 10,000 I/O points. Six ProSafe-PLCs are used for the burner management emergency shutdown processes, and an Exaquantum plant information management system calculates and reports on plant efficiency. Since this facility came online in 2007, it has operated smoothly and experienced no major failures.



Waste to energy process

The Challenges and the Solutions

Compliance with regulations

To comply with a new European directive on waste incineration that was issued in December 2000 and would go into effect five years later, TIRU decided to replace the entire DCS at the Saint-Ouen WTE plant. The criteria for the new system were as follows:

- Great flexibility
- Fast processing of information
- Capable of replacing existing security functions
- Can issue historical message reports
- Includes a unit supervisory function

The decision to award this project to Yokogawa France was based on its ability to provide a comprehensive hardware, software, and support solution. Specific considerations included:

- The Yokogawa CENTUM CS 3000 DCS is state-of-art and its design is based on the insights gained from Yokogawa's long and wide-ranging industry experience and know-how.
- Yokogawa is able to offer a complete range of services, from plant design, installation, and start-up through to testing, maintenance, and training.

Steady and constant steam generation

WTE plants are large-scale, complex facilities comprised of incinerators, boilers and turbines, and pollution prevention equipment. Such facilities must process a steady flow of municipal waste and generate steam at a constant rate and temperature while keeping NOx emissions within strict guidelines. To maximize safety and efficiency while ensuring the steady and continuous supply of steam to CPCU, TIRU SA sought wherever possible to automate operations at the Saint-Ouen facility. This includes the incinerator start-up process, which must be done carefully to prevent damage to the incinerators' interior walls. Natural gas-fired burners operate until the interior temperature reaches 850 deg C, whereupon waste is fed into each incinerator chamber by a stoker. The complete incineration of waste at temperatures between 850 and 1,150 deg C and the steady production of steam is assured by controlling the supply of air to the combustion chamber and varying the speed of the stoker, which delivers precisely weighed amounts of waste. The flue gas needs to pass through a bag filter to remove solid particles, and waste water must be monitored and controlled to ensure regulatory compliance. All control strategies and sequential procedures are configured in the integrated CENTUM CS 3000 and ProSafe-PLC systems.

Central control room

Waste crane

Visualization of production data

To ensure that its facility operates safely and efficiently and remains in compliance with government directives, TIRU SA relies on a Yokogawa Exaquantum plant information management system to collect all process data. This includes data on the amount of waste fed into each incinerator (weighed by the crane system), the amount of air supplied to each combustion chamber, incinerator temperature, the amount of water fed into each boiler, the amount of generated steam, O2 levels in the flue gas, and the pH and conductivity readings for the waste water. This is used to calculate plant performance and generate the reports needed to optimize operations and demonstrate regulatory compliance.

Easy engineering and maintenance

To improve plant operations, the plant operators need a control system that is easy to configure and maintain. Working from their CENTUM CS 3000 engineering workstations in the rack room, the plant's engineers can go online to modify the system configuration, download new configuration data, and implement modifications. This can be done easily and at any time.

Engineering workstations and FCS & wiring cabinets in rack room

Customer Satisfaction

Michel Ciarcia, director of the Saint-Ouen facility: "We help make Paris a nicer place to live by burning household waste and providing a steady supply of steam 24/7. We carefully manage and control the emission of flue gas into the atmosphere and waste water into the Seine river. We are trying to improve our recycling of resources and energy by efficiently reusing combustion heat (through the supply of steam to CPCU and the generation of electricity) and supplying incinerator ash to cement plants. Atmospheric pollutants like fly ash, hydrogen chloride, sulfur oxide, and nitrogen oxide are scrubbed from the exhaust by the bag filter, flue gas cleaner, and other state-of-the-art pollution-prevention systems. We have set antipollution targets that are even tougher than the government's regulations and meet or exceed them. We minimize the generation of dioxins through careful combustion management and the use of the latest equipment, and have achieved the emissions goal set under the regulation." "We are very happy with Yokogawa's system and software, and appreciate their high reliability. We will continue to work with Yokogawa to enhance our operational excellence."

Yokogawa Electric Corporation

YOKOGAWA ELECTRIC CORPORATION
World Headquarters
9-32 Nakacyo 2-chome, Musashino-shi, Tokyo 180-8750, Japan
http'//www.yokogawa.com/

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