

Application Story

Industry: **Water**

Products: **Control Systems**

Sewage treatment plant Hamburg



Reference project
Sewage treatment plant
Hamburg

 **MITSUBISHI ELECTRIC Group**
ME-Automation Projects GmbH

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Reference project
Sewage treatment plant
Hamburg

Customer:	Hamburg Wasser
Plant:	Klärwerksverbund Köhlbrandhöft / Dradenau
Population equivalents:	2.9 million
Project value:	~ 34.0 million Euro
Project duration:	2000–present (in discrete construction stages)

Description

The jointly operated Köhlbrandhöft/Dradenau installation is Hamburg's central sewage treatment plant. Within the networked system, the Köhlbrandhöft plant represents the first treatment stage, in which the incoming waste water is processed mechanically, followed by partial biological and chemical treatment. The second, final treatment stage is located in the Dradenau plant. The pre-treated waste water from the Köhlbrandhöft plant is pumped to Dradenau through a 2.3 km pipe that runs under the Köhlbrand river at a depth of 80 m.

Sewage treatment plants with such a widely distributed architecture place extremely high demands on plant management as well as maintenance. Without comprehensive process control and automation equipment, plant management and process technology of such complex installations is practically impossible.

Because the existing automation equipment had reached its end of life or was obsolescent, the city's municipal "Stadtentwässerung" commissioned ME-Automation Projects, formerly known as KH-Automation Projects, to modernize the entire control and electrical systems of the Köhlbrandhöft plant in 2000. For the selection of a suitable process management system, features such as distributed architecture, data consistency, the ability to

process large amounts of data, and utmost availability were essential requirements. All of these demands are fulfilled completely by the PMSX[®]pro process management system.

Due to the plant's complex structure with 32 distributed control stations in Köhlbrandhöft, and a secondary treatment stage in Dradenau, very high demands were placed on the process management system's topology. Such large amounts of data can only be handled by a system with distributed architecture and a powerful process management system. By distributing the process control & automation in 60 process servers, together with redundant data storage, utmost availability and highest operational safety of the plant are ensured.

Full access to all of the plant's process data is provided by each of the 30 operating stations. Active redundancies, and the avoidance of "single points of failure" in the architecture permit plant reliability to be increased significantly. Moreover, the system's distributed architecture, and the use of modern switch technology for the networks prevents overloading the system bus.

To ensure efficient plant operation, the process management system permits operation from the central control room or from any of the distributed automation stations, as well as consistent, plant-wide programming from a central engineering workstation.

A large-screen display with 12 video cubes supports the operators and provides detailed process surveys and visual insertions at a single glance. In addition, the system's open structure allows it to be coupled to SAP/R3 and to superordinate hierarchical networks. The conversion and expansion of automation equipment during normal operation and without retroactive effects places highest demands on the engineering system as well as on the process management system. The PMSX[®]pro system is designed so that in the sewage plant's final stage, it will be capable of processing more than 150 000 process variables.





Technical requirements

- Process management of entire plant from a central point
- Operation and monitoring of entire plant from all distributed operator stations
- Vertical and horizontal data consistency as well as consistent linking to superordinate hierarchies
- Consistent data coupling with office network, and link to SAP/R3
- Conversion and expansion during normal operation without retroactive effects
- System-wide engineering from a central engineering workplace
- Handling of more than 150.000 process variables in the plant's final stage
- Archiving of all incoming alarms & messages during the entire life cycle
- Archiving of all relevant measurement values in appropriate compression stages
- Strict data consistency in all software tools
- Access to all process values from the office environment
- Standardized software tools in accordance with IEC 61131-3
- Redundant process servers and automation stations for discrete plant sections

Scope of delivery

- Process management system PMSX®pro
- Automation equipment
- Network using switch technology
- Central control room with large-screen display
- Low-voltage switchgear
- Installation & wiring
- Target specifications / engineering / programming
- Documentation using EPLAN
- Factory tests with plant simulation
- Commissioning / trial operation / training

Process management characteristics

- | | |
|---------------------------|----------------------------------|
| Process management system | PMSX®pro |
| Topology | distributed system |
| Network | optic fiber
Ethernet TCP/IP |
| Automation system | Mitsubishi System Q |
| Data points | about 100 000 |
| Automation stations | 149 |
| Operating stations | 46 |
| Process servers | 56, of which 32
are redundant |
| Large-screen display | 12 video cubes |

Excerpt from our reference list

				
Waste incineration plant Frankfurt	Waste incineration plant Iserlohn	Waste incineration plant Weißenhorn	Wastewater treatment plant Erdinger Moos	Wastewater treatment plant Bad Homburg Ober-Eschbach
				
Milk production Regensburg	Energy supply center Dresden	Energy supply center Oberhausen	Pellet production plant Offenbach	Biomass CHP plant Wiesbaden
				
Energy supply center Munich Airport	Waste incineration plant Frankfurt	Drinking water plant Haltern	Sewage network and wastewater treatment plant Hamburg	Pellet production plant Dotternhausen
				
Wastewater treatment plant Düsseldorf-Nord	Waste incineration plant Frankfurt	Waste incineration plant Hamm	Waste incineration plant Frankfurt	Facility Management Control System Dresden
				
Facility Management Control System Nijmegen	Tank terminals Rotterdam	Barthel Pauls Söhne AG Biomass CHP plant	Wastewater treatment plant Stuttgart-Mühlhausen	Wastewater treatment plant Nuremberg
				
Wastewater treatment plant Nidderau	Wastewater treatment plant Landshut	Drinking water plant Friesland		
				
Tank terminal Botlek	Sewage network Wuppertal			

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