

## Application Story

Industry: **Water**

Products: **Control Systems**

# Nürnberg sewage treatment plant



Project of ME-Automation Projects GmbH, a member of the Mitsubishi Electric Group. First published in June 2014.

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# Reference project Nürnberg sewage treatment plant

Customer:	Stadtentwässerung Nürnberg
Plant:	Sewage plants 1 and 2
Population equivalents:	1.6 million
Project value:	~ 16.5 million Euro
Project duration:	2000–present (in discrete construction stages)

## Description

Nürnberg's sewage plants 1 and 2 are the large central treatment systems for the city. With a capacity of 1.4 million population equivalents, plant 1 is a two-stage biological sewage plant with a downstream waste water filter. The smaller plant 2 is designed for 230 000 population equivalents. Together, both treatment plants prevent pollution of the rivers Pegnitz and Regnitz, and ensure a lasting high water quality of the two rivers.

During daytime operation, control of each sewage treatment plant is handled from an own control room. Because the control room of plant 2 is not manned during the night, its operation is switched to the central control room of plant 1. Of course, it is also possible to control and monitor both sewage treatment plants from any one of the distributed operating stations of the combined system. Such widely distributed plant layouts place high demands on the topology of the process management system. Without comprehensive process control and automation equipment, plant management and process technology of such complex installations is practically impossible. In the early 90's, the two plants were initially equipped with the distributed process management system PMS 68000 from ME-Automation Projects, formerly known as KH-Automation Projects.

Because some of the plant's most important automation equipment had reached its end of life or was obsolescent, adequate maintenance – and therefore plant reliability – could no longer be ensured. Consequently, there was urgent need to renew the process guidance & automation system. In addition, overall plant efficiency was to be increased by installing modern technology.

In 2004, Nürnberg's municipal water authority commissioned ME-Automation Projects, previously KH-Automation Projects, to upgrade the existing control & automation systems by means of modern, powerful and innovative technology that was to be installed with the help of an efficient migration concept. During assessment of the new process management system, the distributed architecture of PMSX<sup>®</sup>pro, its data consistency, and its high availability and reliability were decisive factors.

The required high levels of availability and reliability were achieved by means of redundant data storage and by distributing the process control tasks among 37 process servers. Full access to all of the plant's process data is provided by each of the 38 operating stations. Active redundancies, and the avoidance of "single points of failure" in the architecture permit plant reliability to be increased significantly. Hereby, redundancies in the process technology equipment are not cancelled by the process management system.

Thanks to the distributed architecture of PMSX<sup>®</sup>pro, plant conversion was possible without interrupting normal operation. In such large plants, the analysis of weak points and tracing the causes of faults are significant factors for efficient and reliable operation. Therefore, a particularly powerful archive server provides long-term storage of all messages and process values. Consistent data coupling to the office network gives the process engineers access to all relevant data for further processing and analysis using the office PCs.





## Technical requirements

- Process management and sequence control of entire plant from a central control room
- Operation and monitoring of entire plant from all distributed operator stations
- Stepwise migration from the existing control & automation system to PMSX<sup>®</sup>pro
- Combining six independent data networks via a gigabit backbone
- Vertical and horizontal data consistency
- Consistent data coupling with office network
- Conversion and expansion during normal operation without retroactive effects
- System-wide engineering from a central engineering workplace
- Long-term storage of data and messages
- 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

## Scope of delivery

- ▮ Process management system PMSX<sup>®</sup>pro
- ▮ Automation equipment
- ▮ Network using switch technology
- ▮ Target specifications / engineering
- ▮ Programming according to IEC 61131-3
- ▮ Documentation
- ▮ Factory tests with plant simulation (FAT)
- ▮ Commissioning / trial operation
- ▮ Personnel training

## Process management characteristics

- |                             |                                |
|-----------------------------|--------------------------------|
| ▮ Process management system | PMSX <sup>®</sup> pro          |
| ▮ Topology                  | distributed system             |
| ▮ Network                   | optic fiber<br>Ethernet TCP/IP |
| ▮ Automation system         | Mitsubishi System Q            |
| ▮ Data points               | about 80 000                   |
| ▮ Automation stations       | 56                             |
| ▮ Operating stations        | 38                             |
| ▮ Process servers           | 37                             |



# 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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