Customer case study
Water | Wastewater

Warendorf wastewater treatment plant benefits from PLC programming water process library

Simple and consistent process programming

Summary

• A German wastewater facility upgrading its facility needed consistent process optimization and high plant availability, all at a cost-effective price

• Plant managers wanted a standardized PLC programming function module to ensure consistent programming at its different facilities

• Employees at the wastewater facility worked with Phoenix Contact, whose industry experts were already working on a new process library for sewage and water treatment plants

• Combining this collective expertise resulted in a standardized, user-friendly function module PLC programming library

Customer Profile

The Warendorf wastewater treatment plant (together with its sister, Hoetmar wastewater treatment plant, and a far-reaching network of pumping stations and canals), collects and purifies wastewater from 40,000 citizens, along with commercial and industrial customers. The purification capacity of the facility amounts to 80,000 population equivalent (PE).

The operator of the Warendorf wastewater treatment plant first implemented control technology from Phoenix Contact when modernizing the facility in 2008. Because of this successful collaboration, the managers decided to work with Phoenix Contact again when it was time to upgrade the Hoetmar wastewater treatment plant and several external buildings.

The Warendorf wastewater treatment plant incorporates cutting-edge technology, from the SCADA system and control technology to the processes. The modern equipment provides the basis for consistent process optimization and high plant availability, in addition to allowing the operator to perform all tasks in a cost-effective manner. The wastewater treatment plant staff must be able to access all stations and the relevant process data at all times.
**Challenge: A user-focused solution**

When defining the project parameters, the client expressed the need for a standardized PLC programming function module library to ensure consistent programming of the various facilities. At that time, Phoenix Contact’s industry experts were already working on a new process library for sewage and water treatment plants. Phoenix Contact continued this project in cooperation with the Warendorf wastewater treatment plant staff to the benefit of both companies. For example, Warendorf instrumentation and control personnel used their application knowledge to help Phoenix Contact expand the wastewater-specific function block library. This ensures that wastewater I&C personnel at other utilities will find that much of the programming task has already been done for them, allowing them to quickly program their own application.

**Solution: Control technology that can be flexibly expanded or replaced**

The client wanted easy-to-operate equipment, to avoid long training periods and assure a quick response if a fault occurred. Because of this, the concept of “from users, for users” played a key role in the process library development. The resulting solution enables the water treatment plant staff to quickly troubleshoot faults, even if the associated functions are rarely used, and to improve the implemented processes (Figure 1).

The entire treatment process at the Warendorf wastewater treatment plant uses components and systems from Phoenix Contact based on Profinet technology. Modbus/TCP protocol is also available. The modular design of the control technology – which can be flexibly expanded using the required standard and/or function modules – significantly reduces stock levels of the various devices while maintaining the same level of plant availability (Figure 2). If individual processes need to be switched over to a more sophisticated controller class due to rising requirements, operators can add the same I/O modules from the Inline product line that were used for the PLC to be replaced and continue to use the same user application. Touch panels are installed directly in the various stations to provide facility control and monitoring (Figure 3). This allows staff to autonomously access all required information at any time and perform all necessary actions to the process on site.

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Figure 1: Operation and monitoring of the process flow.

Figure 2: Modular ILC 350 PN Profinet control from Phoenix Contact.

Figure 3: Keeping an eye on the sludge-thickening process by means of key information displayed directly on the touch panel.
Figure 4: Provisions in the library allow for hands-off automatic control.

Various function modules for the different plant components
Uniform software for programming and operating all control systems provides for the water treatment plant staff with many other benefits. The new “InSyWater-Waterprocesslibrary” process library from Phoenix Contact offers various functions for different plant components. For instance, the operator can use the standardized function modules to put together a project custom-tailored to a specific plant. The programmer is supported by easy-to-use help functions.

Tim Jungmann, director of operations at the Warendorf Wastewater Treatment Plant, commented, “True to the concept ‘from users, for users,’ the process library does not use any unnecessary programming jargon but rather relies on functions and names the plant staff is familiar with. In addition, typical plant functions such as release rules, manual/automatic mode changes, or target value settings are made available as function modules.”

The measured value modules are an example of the operation-driven design of the process library. They can be used to create a process replacement value, effectivley enabling maintenance and calibration tasks to be performed during ongoing operations. The library also contains various specialized function modules that capture the rich industry experience of the Warendorf staff.

Results: Highly optimized process flows
Phoenix Contact’s device technology philosophy provides many benefits. Thanks to modern web-browser technology, components can be simply configured, rather than programmed. The employees operating the Warendorf water treatment plant greatly appreciate this approach.

Phoenix Contact’s product portfolio, developed according to international standards, supports all relevant communication protocols. This means that the devices can be readily interfaced with third-party components. As a result, the company closely cooperates with the various equipment and instrumentation suppliers, whose process, measuring, and drive technology is applied in water treatment and sewage plants. The new process library simplifies many processes, including addressing the installed drives and valves, since the function modules contain the same functions and use consistent labeling for inputs and outputs, while avoiding any complicated structures.

The new process library also improves the workflows at the Warendorf wastewater treatment plant. The controls programming has become even simpler, which helps to reduce errors and makes the program code easier to comprehend.

“We are looking forward to continuing the successful cooperation between the teams at both companies,” concludes Tim Jungmann. “We will jointly develop new functions and modules that will further optimize daily tasks at the wastewater treatment plant. The key incentives for us to continue this partnership include the user-oriented approach, sustainable concept, and innovative technology of Phoenix Contact.”

The new “InSyWater” process library supports the automation of water treatment and sewage plants, so it provides functions from both areas. The function modules and help texts were created based on the extensive hands-on knowledge of operators and planning engineers from both industries. As a result, the texts and labels are written using terminology that operators are familiar with. This allows staff to easily perform even infrequent tasks such as adjusting measuring points in the program, optimizing process workflows, or diagnosing and removing faults. The library also provides planners with a valuable tool, as it allows them to specify a standard that results in consistent and user-friendly program code. Moreover, system integrators can use the InSyWater process library to draw on proven function modules that greatly simplify engineering tasks.