

Effective network maintenance increases operational reliability

star. Energiewerke GmbH & Co. KG supplies around 48,000 inhabitants of the town of Rastatt in Baden-Württemberg with drinking water via a pipe network around 200 kilometers long and 8,200 house connections. There are almost 13,000 valves in the pipe network, many of which are still old gate valves. The company's three waterworks - Rauental, Niederbühl and Ottersdorf - were commissioned between 1902 and 1977 and have been repeatedly modernized over the years. The Ottersdorf waterworks covers around 70 percent of the water demand, while the Rauental waterworks accounts for around 30 percent. Niederbühl has been declared an "emergency water reserve plant" and has been out of operation since 2011.

Drinking water. Following the PFC contamination, star.Energiewerke immediately developed solution concepts for a safe drinking water supply and is now gradually implementing the extensive range of measures. The most important component of this is the rapid restoration of supply redundancy at the Ottersdorf waterworks: drinking water connection lines to the water supply of neighboring Stadtwerke Gaggenau were created for this purpose. The Rauental waterworks is currently being modernized and will establish redundancy by connecting to the water supply of Stadtwerke Gaggenau after the planned commissioning at the beginning of 2018.

In 2012, per- and polyfluorinated chemicals (PFCs) were detected in the groundwater for the first time. As a result, the Rauental and Niederbühl waterworks were taken off the grid in 2013. Since then, the main waterworks in Ottersdorf has been supplying all districts with

If necessary, this step therefore means reversing the flow in some pipes. To avoid possible consequences such as turbidity in the drinking water, the pipelines must always be as clean as possible. For this reason, the water supplier commissioned a

Fig. 1: Complex cleaning in the Rastatt district of Plittersdorf



Source: Hammann GmbH

In March 2016, Hammann GmbH decided to clean its network with the Complex pulse flushing system (Fig. 1).

As the valves are often operated several times during this measure, a systematic check of their function was a good idea. If the inspection at Complex net-care reveals gate valves that do not close, they are repaired or rehabilitated. The measure carried out between March and August 2016 involved 73.6 km of pipes in DN 50 to DN 400 with 1,052 gate valves, one butterfly valve and 782 hydrants.

When inspecting gate valves and hydrants, the first step is to locate the valves marked on the plan. It is often the case that road caps are asphalted over or fittings are not accessible. In a second step, the function of the fittings was checked. This is only possible when pipe network sections are out of operation, as is the case during cleaning. In Rastatt, 77 percent of the valves that were not fully functional were restored to working order.

The measures taken not only help to extend the service life of the valves used, but also to keep the planning and maintenance documents up to date. The combination of valve inspection with condition-based refurbishment

and cleaning ensures that all mobilized deposits are reliably removed. In addition to these hygienic aspects, the process is also economically relevant: several non-functioning valves could be refurbished and did not have to be replaced. Overall, this saving compensates for the costs of cleaning.

Complex netcare also takes into account the changed conditions of the economic and spatial environment; for example, service life: today, DIN EN 805 specifies a planned service life of 50 years for pipes, which means an annual renewal rate of 2 percent. However, this is virtually impossible today because in many places there is neither the budget for renewal nor the possibility of new construction. On the other hand, failure-related replacement in the event of damage such as burst pipes is cost-intensive and risky for reasons of supply security. It is difficult to continue with the same water costs. Consequently, the only remaining option is condition-based maintenance, which is based on the current status and development trends compared to a defined target status.

star. energiewerke plans to upgrade the status of the remaining distribution grid in the same way over the next few years.

optimize. And the company is thinking ahead: it also wants to characterize the valves based on the actuation mode and stroke, which will enable a comparison with data directly after basic cleaning and after different operating times. Flushing with a clear water front to maintain the distribution network is also being considered. This measure would provide data on the extent of loose deposits in certain pipe sections. The Hammann systems document the condition of the relevant pipe sections in the form of a traffic light; the color results from the large amount of data recorded during the individual inspections. Based on this documentation, maintenance cycles for water flushing in certain pipe sections and for valve inspections can be optimized.

Functioning fittings and clean pipes are an essential prerequisite for a high level of operational safety in the drinking water supply. This is because only functional fittings enable routine water flushing based on flushing schedules. Future maintenance cycles for these valves can be adapted to the results of the valve inspection. The measures implemented in Rastatt are also of particular economic relevance from a cost-benefit perspective. ■

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