HydroGroup

Edition 28/2017

Water News

Operational reliability

Emergency supply systems in the supply industry

In a general sense, emergency supply systems refer to full standby power supply systems which can completely take over the power supply to delimited units, such as supply and waste disposal plants, public authorities, IT infrastructure and companies, in the event of a power failure, even for longer periods of time.

You don't necessarily need to read Marc Elsberg's „Blackout: tomorrow will be too late", a power outage disaster novel, to vividly imagine the effects of a longer term power failure. The catastrophic scenarios in the report for the German Bundestag are no less informative. The report comes to the sobering conclusion that a large-scale power outage would quickly turn into a national catastrophe. Although the consequences of a longer lasting power outage are extremely complex with very few areas of life remaining unaffected, the vital importance of a stable, reliable power supply is grossly underestimated.

Many believe that there is no danger and there is no need for special precautions since the distribution grid has been relatively stable to date. However, power outages over longer periods of time can also affect our supply infrastructure for the mid-term. There are enough examples on a national and international level: natural disasters, wars, terrorist attacks, targeted sabotage, IT attacks and similar incidents to name just a few.

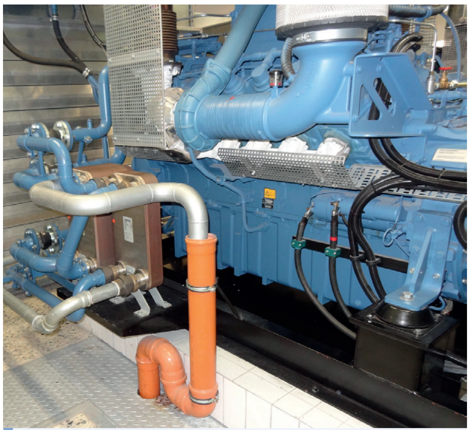
Water supply and waste water disposal

Critical infrastructures include both water supply and waste water disposal. As a general rule, a failure in the power supply is noticed immediately with the consequences soon becoming apparent. Unless you happen to be under the shower, you won't notice a failure in the water supply straight away. Many associate water supply with supplying drinking water to the general population only, but it is much more than that. A failure could cause huge major fires. Waste water disposal also directly depends on the drinking water supply. Sewage conveyance grinds to a halt by the time pipes are empty, if not before. Sewage remains in gravity pipelines while pumping stations can no longer work either and clog up or overflow.

Problematic situations can also be expected to arise quickly in medical centres, hospitals, and care and retirement homes when water supplies fail. Some of these institutions have emergency supply systems to provide power, but the water supply is not safeguarded. At best, it is buffered. Basically, it can be said that a longer breakdown in water supply systems may cause massive supply and disposal problems. Failing to provide an emergency supply system is extremely questionable, if not downright irresponsible.

The best emergency supply systems powered by diesel engines ensure fast, automatic switch-on in seconds when a stationary design is used, thus ensuring local power supply is re-established to the facility concerned. Supply systems can be portable or stationary. Portable systems need to be turned on manually at a suitable feed-in point with a transfer switch.

Air-cooled emergency power generator



Water-cooled emergency power generator

Designing an emergency supply system

First of all, planners should consider all factors and strike a balance between system vulnerability and system resilience.

A water supply system with elevated tanks or water towers, which can at least supply water on a temporary basis thanks to geodetic pressure, should be classified differently to a ground water tank with downstream pressure booster systems.

The volume of a tank for drinking water is generally based on daily need, meaning that elevated tanks will be able to maintain supplies for hours. However, there is no guarantee of supply lasting for several days even with elevated tanks.

Today's water supply systems are often networked through an IT infrastructure. A general power failure will also bring such systems to a standstill. Easy-to-operate manual switching devices should thus always be provided on site for pumps, valves and pressure booster systems.

All the tasks required for emergency operation also need to be established in this first step. These also form the basis for calculating the capacity for emergency operation. Restrictions on comfort and convenience can definitely also be taken into account here as should staff availabilities.

Another constantly debated issue is how much fuel should be kept in reserve. The author considers this debate as pretty irrelevant, particularly in the context of a major power outage, since fuel supply also needs to be assured. In all probability, fuel provision can no longer be guaranteed either if there is a wide-area power outage. The issue will arise when the emergency supply system is discussed, if not before. One argument very often used against reserve supply is that fuel ages.

This argument is no longer valid if the emergency system is simply integrated into normal operation – it must be capable of operating parallel to the grid. Such a system can thus take over power supply automatically on a regular basis. The engine and generator are scheduled to come into operation at specific times and fuel is routinely renewed as a consequence.

In the case of well systems in water protection areas, the emergency supply system does not need to be installed in or next to the well building. An external transformer station or power transmission station can also be used to house such systems.

Portable or stationary

Main pumping stations and all crucial systems with high power requirements must be equipped with a stationary generator which automatically switches on in the event of a power failure.

This is the only way to guarantee immediate operation at all times.

Emergency power generators with single-axle, tandem-axle or 2-axle chassis can be used for portable use.

You will find a detailed report on this issue at hydrogroup.de.

More: ingo.fuerbach@hydro-elektrik.de or
wolfgang.sontheim@hydro-elektrik.de

INFORMATION

Partial water treatment upgrade in a power plant

Sales & Solutions GmbH, an EnBW subsidiary for energy contracting, has contracted RWT GmbH to partially upgrade an existing water treatment system in a power plant in Bomlitz, Lower Saxony, Germany.

The existing gravel filtration system is to be extended to include an upstream intensive aerator stage to oxidise iron and manganese, optimising well water treatment with a flow rate of 130 m³/h and a comparatively high iron and manganese content. Dosing systems for sodium hydroxide and potassium manganate will be installed downstream to improve biological demanganisation along with a final demanganisation stage comprising quartz gravel and catalytic filter materials.

One of the three existing ion exchanger channels is to be upgraded to produce fully demineralised water. Consisting of a mixed fluidized bed process with an intermediate CO_2 trickle bed, the new baseload channel ensures high availability for fully demineralised water production.

Both the well water treatment and the existing demineralised water channels will be integrated into the new PCS7 control system. Operating and monitoring systems (clients) with 19" panels will be installed at both locations, thus ensuring strict system availability requirements are met.

Remodelling will commence in June 2018 and is scheduled for completion with trial operation in December 2018.

More: m.baumann@rwt-gmbh.com or
m.stueker@rwt-gmbh.com

Difference between softening and demineralisation

Water is an excellent solvent. That's why natural water contains dissolved minerals and salts, organic compounds, gases and other elements in different concentrations and consistencies.

Salts dissociate in water and form positively charged cations and negatively charged anions.

During softening, cations from the dissolved alkaline earth metals calcium and magnesium are replaced with sodium ions in a cation exchanger. This process replaces the hardeners only while the overall mineral content remains the same.

Complete demineralization removes all of the salts dissolved in the water in a combination of cation exchangers and anion exchangers.

WASSER TREATMENT IN INDUSTRY

Two-lane reverse osmosis with downstream counterflow water softening

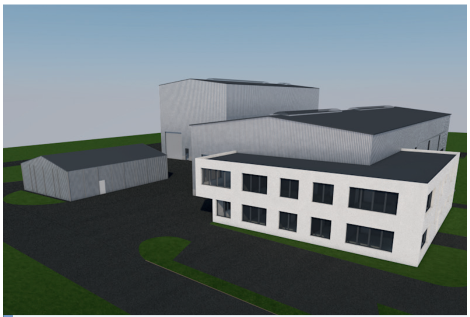
RWT GmbH is building demineralisation system for a urea producer. The permeate output from the system - two reverse osmosis systems and two downstream softening filters – is up to 120 m³/h.

The reverse osmosis systems will operate with a water conversion factor of 80% at an operating pressure of just 6.6 bar (at 25 °C). The strict requirements for residual conductivity (≤ 15 µS/cm at 20 °C) and residual silicate (≤ 0.02 mg/l) will be met with a temperature range between 0.5 and 25 °C. Both reverse osmosis channels will operate as stand-alone systems subject to the water level in the permeate tank. A permanently installed CIP (cleaning-in-place) purification system with a heating element and purification pump will also form part of the system installation. The two downstream softener filters will operate based on a counterflow system. This will ensure sparing mineral consumption while producing a very low residual hardness of 0.02 °dH in the discharge. The scope of delivery includes fully automatic system control with PLC power electronics and appropriate measuring technology.

More: m.baumann@rwt-gmbh.com or
m.stueker@rwt-gmbh.com

Nine-figure investment to secure future

Hydro-Elektrik GmbH is making a nine-figure investment to ensure future growth at the company's Tannheim production location.



Basic design

After acquiring an additional 15,500 m² of land, the company now has a total of some 23,500 m² of industrial land at the Tannheim location.

This is the company's eighth building project since it was founded. Production Workshop II is to be extended by 660 m² while a two-storey extension with a basement, also covering 660 m², will house new office and recreational spaces. Construction commences in spring 2018.

More: andrea.strobel@hydro-elektrik.de or
karl.weisshaupt@hydro-elektrik.de

IMPORTANT DATES

5th to 6th Dezember 2017
DVGW Meistererfahrungsaustausch 2017
Maritim Strandhotel, Lübeck-Travemünde/
Deutschland
Conference and exhibition

25th January 2018
TIEFBAU-FORUM 2018
Donauhalle (Ulm-Messe), Ulm/Deutschland
Conference and exhibition

LEGAL INFORMATION

HydroGroup
www.hydrogroup.de

Publisher
Hydro-Elektrik GmbH
Angelestraße 48/50
88214 Ravensburg
info@hydrogroup.de

Editor
Manfred Brugger
mb@hydrogroup.de

Layout
Silvia Mesmer
silvia.mesmer@hydrogroup.de

Company publication