



## APPLICATION NOTE

Energy

### Overfill protection for wastewater collection pits at a power plant

- Monitoring of collection wells containing power plant wastewater up to 80°C / 176°F
- TDR level measurement for automated pit emptying using pumps
- Cost-effective replacement for faulty pressure gauges

#### 1. Background

A steel producer in the Ruhr region, Germany, runs its own power plant with an output of several hundred megawatts. Exhaust gases from steel production and the coking process are used as energy sources for power generation. The electrical energy produced in the process is then made available to a nearby metallurgical plant and coker unit or fed back into the public grid.

A variety of wastewater accumulates at the power plant. It is collected centrally and then fed to a wastewater treatment plant. To do this, the power plant has a drainage system which uses channels to direct the wastewater from different areas of the power plant to 4 collection pits.

#### 2. Measurement requirements

The wastewater collection pits are between 2.5 m / 8.2 ft and 4 m / 13.1 ft deep. To prevent overflow, the pits must be pumped out at regular intervals. To control this process automatically via a PLC and to prevent the pits from overflowing, the customer needs to continually monitor the level.

At first the operator of the power plant tried to control the level using pressure gauges. However, this soon proved an unsuitable method for this application as the electronics were quickly destroyed in the 80°C / 176°F wastewater. The power plant operator then started to look for an alternative measuring technology that would be as cost-effective as possible for this simple application but that would also be stable and provide reliable measuring results.

## 3. KROHNE solution

The customer decided to use 4 OPTIFLEX 1100 C units. The guided radar (TDR) level meters were installed above the wells. The single probes ( $\varnothing 2 \text{ mm} / 0.08''$ ) were installed in existing 2-inch stilling wells that reach deep into the pits. A pipe collar was used to reduce the  $G \frac{1}{2}$  process connection of the measuring devices to the nominal size of the stilling well.

Using the quick configuration and by indicating 5 measuring parameters, the customer was able to start up the 2-wire level meters himself. The measured values of each OPTIFLEX 1100 are transmitted via 4...20 mA analog output to a PLC. As soon as the level exceeds a defined range, the PLC activates the pumps and the wastewater is pumped out of the wells.

## 4. Customer benefits

Using the OPTIFLEX 1100, the operator of the power plant can empty the wastewater wells automatically again. This level meter is a very cost-effective solution for such a simple application. Other measuring principles are too expensive or not adapted. Compared to the previously used pressure gauges, the level meter measures reliably and with sufficient accuracy. The electronics for the device are not located in the medium and are thus not affected by its temperature. Nor do fluctuations in pressure and density or varying dielectric constants affect the measurement.

The customer was also able to save money on the installation of the OPTIFLEX 1100 as it was possible to make use of the existing infrastructure, the stilling wells, for the level measurement. The fast start-up was another advantage for the customer. Each device was easy to set up using the display and the installation wizard, no training required. Unlike other measuring devices such as capacitive (RF) level meters, which require wet calibration, the OPTIFLEX 1100 does not need to be calibrated.



OPTIFLEX 1100 with reduced process connection



Installation in stilling well

## 5. Product used

### OPTIFLEX 1100 C

- 2-wire level meter for liquids and solids
- All-purpose (in non-hazardous areas)
- Measuring range up to 20 m / 65.6 ft (liquids) and 10 m / 32.8 ft (solids)
- Simple navigation using menus without opening the housing
- Stainless steel probes and process connections
- For process temperatures up to 100°C / 210°F and pressures up to 16 barg / 232 psig
- Display in 9 languages including Chinese, Japanese and Russian



### Contact

Would you like further information about these or other applications?  
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