APPLICATION REPORT Power

Level measurement and detection in an irradiating environment

- Water level measurement and threshold detection
- Increased safety
- Turnkey solution

1. Background

Of the major global energy providers, the EDF Group is the largest nuclear power station operator in the world (with an installed power of 63,130 MW). In its capacity as an operator, EDF takes responsibility for nuclear safety, giving it absolute priority under the independent control of the Nuclear Safety Authority. This approach to safety involves in particular continual improvement, maintenance of installations, protecting equipment from obsolescence and implementing new, more efficient technologies.

Digital display and threshold detection

2. Measurement requirements

The customer stores his TSW (treatment of solid waste) condensates in two underground tanks at a maximum pressure of 7 bar / 151.5 psi and a maximum temperature of 60 °C / 140 °F.
Access to these tanks is extremely limited (access tunnel) and personnel must wear protective clothing adapted to that environment. A mixing system ensures homogeneity by injecting air and reheating the liquid.
These tanks boast a capacity of more than 9 m^3 and are equipped with a device for continuous level measurement and a device for threshold detection to prevent the tank from overflowing. The customer had previously been using 2 capacitive level transmitters from a competitor that no longer functioned and whose replacement the manufacturer would not guarantee. Given that these probes had been installed prior to the tank being located in its current position, removing the probes was extremely difficult and much thought went into finding the best solution.

3. KROHNE solution

Connection boxes

Transmission via coaxial cable with no electronics in the probe sub-assembly

For some years now and within the context of obsolescence, KROHNE has been proposing solutions involving device studies and new projects on a case-by-case basis, in line with customer constraints and nuclear standards.
The recommendation was made to replace the 4 competitor's capacitive probes with 4 OPTIFLEX 2200 / POWERFLEX 2200 level transmitters (2 for level measurement and 2 for threshold detection). This device is the "nuclear" version of the OPTIFLEX 2200 C level transmitter.
This model allows you, for example, to completely avoid radioactivity, thanks to the electronics unit being separate from the rest of the device. There is no electronic component on the top of the tank.
This means that a coaxial cable transmits the signal from the top of the probe to the electronics unit located in the green zone (non-radioactive zone).
The thresholds for "high" level detection (level threshold) are configured using a C95 digital display installed in the green zone. KROHNE also put connection boxes in the cabinets for these displays, allowing a PC to communicate with the devices without opening the current loop.

4. Customer benefits

Once installed, the OPTIFLEX 2200 / POWERFLEX 2200 level transmitter requires no maintenance. Operations no longer require the user to go into the contaminated tank zone. The user simply works on the converter or the displays in the green zone.

KROHNE proposed a turnkey solution: installation on-site, commissioning and installation follow-up in accordance with nuclear requirements.

5. Product used

OPTIFLEX 2200 / POWERFLEX 2200

- 2-wire loop-powered HART® TDR level transmitter for liquids and solids
- Horizontal and vertical positioning of display
- The remote converter can be installed up to 100 m / 328 ft from the probe
- Measuring range up to 40 m / 130 ft
- Designed specifically for the nuclear power industry
- Specialised construction for the nuclear sector

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