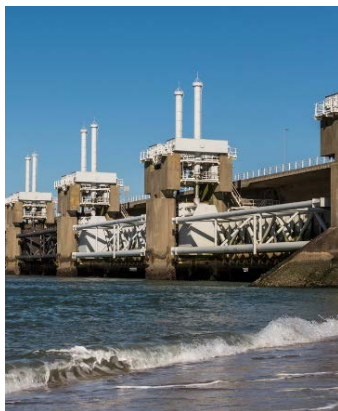




IMPROVEMENT OF A RADIATION MONITORING SYSTEM FOR EXTREME WEATHER CONDITIONS

Borssele Nuclear Power Plant, Netherlands



A dike in the Netherlands

/ CONTEXT

The Fukushima nuclear disaster in March 2011 put environmental risks related to extreme weather conditions in focus. Consequently, European national and supranational authorities asked for risk and safety assessments to be performed in the 143 nuclear power plant units of the European Union, in order to double-check "the ability of nuclear facilities to withstand damage from hazards such as earthquakes, flooding, terrorist attacks or aircraft collision".

In the Nuclear Power Plant operated by Elektriciteits Produktiemaatschappij Zuid-Nederland (EPZ) in Borssele, Netherlands, safety is a key concern and a priority since it has been operational in 1973. Primary relevant safety scenarios for external incidents at the Borssele site are related to storm and flooding. Although "the initial results give absolutely no reason to question the safety of the Borssele Plant" said the Dutch Minister of Economic Affairs, Agriculture and Innovation after the stress test organized in 2011, the Borssele Plant operator EPZ decided to go deeper on safety development with an improvement plan.

/ MATERIAL

EPZ decided to enhance its existing gamma monitoring system with seven additional gamma dose rate measurement probes (GammaTRACER XL2), one new radionuclide identification and dose rate measurement probe (SpectroTRACER Air/Soil) and a radio transmission instrument (ShortLINK). All devices are designed by Bertin Instruments, focusing on two main factors: the resistance to extreme coastal climatic conditions, and the capacity to work autonomously from electrical and public communication networks.



Installation of a probe on the 3 m. mast

/ EXTREME WEATHER PROOF

All monitoring probes at Borssele NPP are installed on 3 m high masts in order to stay above the water level, even in case of extreme storm surges and flooding. The masts are 17 cm in diameter with robust concrete foundations to withstand extreme wind conditions (up to 202 km/h for severe storms with high winds and 450 km/h for tornados).

Moreover the GammaTRACER XL2 and SpectroTRACER Air/Soil probes have also been designed to last several decades in robust sealed aluminum housings with nano-paint, despite the corrosive salt-water environment.

/ AUTONOMOUS OPERATION

The monitoring system has to be designed to work independently from the electrical network, i.e. on batteries. The low power consumption technology for the GammaTRACER XL2 as well as for the ShortLINK radio data receiver ensures an autonomous operation for up to ten years.

In case of a mobile network overload or blackout, the dose rate measurement data can be transmitted for several days to a central server up to 5 km with the ShortLINK radio transmission system, using only battery power.

/ CONCLUSION

With this new radiation monitoring system provided and installed by Bertin Instruments, the Borssele Nuclear Power Plant aims to fulfill requirements from nuclear regulators by showing that external hazards have been considered. The objective is to be ready in case of a severe incident, especially a flooding or a storm. In addition to the new system, Borssele is still using the first monitoring system based on the former GammaTRACER BASIC probes, which are still working perfectly 22 years after installation.