

# Nuclear Power Plant Minimizes Safety and Environmental Risks and Reduces Maintenance Costs with Level Control

## RESULTS

- Minimized safety and environmental risks
- Decreased maintenance costs



## APPLICATION

Level monitoring of spent fuel rod cooling ponds

## CUSTOMER

A nuclear power plant in Eastern England

## CHALLENGE

In a Nuclear Power Station, cooling ponds are used to store “spent” Magnox fuel rods prior to transportation for re-processing. The ponds need reliable level control and monitoring for safe operation. The cooling ponds are divided into three separate sections, and each section requires a continuous level measurement with backup high and low alarm points. If the level gets too high, there is risk of overflowing the pond. If the level gets too low, there is indication of a system leak.

Previously, bubbler systems were used for level control and high and low alarms were triggered by the bubblers. These systems had been installed for over forty years and required routine maintenance to validate system calibration and to clean and ensure there was no plugging of the bubbler pipe. The maintenance engineers sought to improve the reliability of the cooling pond system by upgrading the level measurement and adding redundant alarms. They wanted a simple solution to provide alarm monitoring and continuous level measurement that could relay back to a Programmable Logic Controller (PLC). Additionally, access was limited and clearance for an over-head crane had to be allowed above the level instruments. Therefore, the new system would have to be installed on a simple cantilevered mounting plate secured to the cooling pond dividing walls.

Without an upgraded system, this customer risked increasing maintenance costs and overflowing the ponds. The cooling ponds are mildly radioactive and create a safety and environmental risk if flooded into a non-hazardous area. Likewise, an unreliable level measurement might not detect a pond leak which also resulted in a safety and environmental risks.



*Figure 1. The system was easy to install and provided a low maintenance solution*

## SOLUTION

This customer installed three Rosemount 3100 Ultrasonic Level transmitters on a flat mounting plate to provide a continuous measurement of level in all three chambers of the cooling pond. Additionally, six Rosemount 2120 Vibrating Fork Switches were installed on three separate plates (2 per mounting plate) to provide a back-up alarm for High and Low level in each section. These devices are all low profile so crane access was not restricted. The ultrasonic transmitters and vibrating fork switches were powered from a 24 V DC supply in the remote control panel which fed directly back to a PLC in the main panel. These devices are all loop-powered making integration fast and easy. Additionally, they have no moving parts and no calibration so maintenance is minimal.

The new system of level controls was easy to install and provided a low maintenance solution which reduced maintenance costs. The overall system reliability was increased which reduced the safety and environmental risks of overfills and leakage.

## RESOURCES

### Rosemount Oil and Gas Instrumentation

[http://www.emersonprocess.com/rosemount/industry/oil\\_gas/](http://www.emersonprocess.com/rosemount/industry/oil_gas/)

### Rosemount 3100 Series - Ultrasonic Level Transmitter

<http://www2.emersonprocess.com/en-US/brands/rosemount/Level/2100-Series-Level-Switches/2120-Level-Switches/Pages/index.aspx>

### Rosemount 2120 - Vibrating Fork Liquid Level Switch

<http://www2.emersonprocess.com/en-US/brands/rosemount/Level/Ultrasonic-Transmitters/3100-Series-Ultrasonic/Pages/index.aspx>

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