

Power Plant Reduces Risk of Outage and Minimizes Safety Risks with SIL2 Suitable Guided Wave Radar

RESULTS

- Reduced risk of higher operations & maintenance costs
- Decreased safety risks
- Minimized risk of outages



APPLICATION

Steam/Water levels in condenser and water pre-heaters for supercritical circulating fluid bed (CFB) boilers

CUSTOMER

PKE Elektrownia Lagisza (PKE Lagisza Power Plant) in Bedzin, PL

CHALLENGE

During construction of the world's largest supercritical fluid boiler at PKE, engineers needed to design superior safety shutdown systems, stability, and reliability into the steam generation system. Consistent and efficient steam generation relies on fine-tuned operation of the condenser and pre-heaters. If the levels in these tanks get too low, they risk damage to pumps. If the levels get too high, efficiency decreases.

Historically, DP level transmitters and/or displacers are used in these applications. Excursions in the high vacuum/low pressure condenser make it challenging for DP technology to reliably monitor the levels in the tank. Wet-legs and fill heights in the legs can vary widely making it difficult to get a reading during start-up. Both Displacer and DP technology are dependent on density changes which impacts the reliability in pre-heater applications. Displacers are also affected by vibration and turbulence. The mechanical parts can give false readings, and maintenance costs can be expensive. These vessels require reliability at all times and measurement equipment needs to be easy to test and maintain. The extreme temperatures and pressures can also be a challenge on some of the applications.

This customer could experience many negative business results from unreliable level measurements in the steam generation system. The plant risks process instability and potential equipment damage which leads to increased operations costs, maintenance costs, and safety risks. Additionally, they risk unplanned outages.



Figure 1. Three Rosemount 5301 Guided Wave Radars used for condenser level control.

SOLUTION

To address these challenges, PKE installed triple redundant Rosemount 5301 Guided Wave Radars (GWR) with single lead probes on two condensers, eight pre-heaters, and the feed-water tank. The devices on the pre-heaters and feed-water tank were installed with High Temperature, High Pressure (HTHP) probes which are designed to prevent leakage and perform reliably when exposed to extreme process conditions for extended periods of time. GWR technology is not dependent on density changes and manages heavy vibration without impacting measurement reliability. These devices were mounted on chambers directly attached to the vessels thereby giving them access to reliable readings at all times. Additionally, the Rosemount 5300 transmitters were purchased with the QS option which supplied PKE with documentation to help support their use in a Safety Instrumented System.

PKE experience many positive business results with the performance of the Rosemount 5300 transmitters. Since the Guided Wave Radar does not need calibration and provides a reliable measurement throughout commissioning, they are able to maintain process stability thereby minimizing the risk of reduced unplanned outages and equipment damage. These reduced risks lead to decreased operations and maintenance costs and reduced safety risks.

RESOURCES

Emerson Process Management Power Industry

<http://www.emersonprocess.com/solutions/power/>

Rosemount 5300 Series Guided Wave Radar

<http://www.emersonprocess.com/rosemount/products/level/m5300b.html>



Figure 2. Rosemount 5301 GWR with HTHP probe



Figure 3. Reliable level measurement on this pre-heater tank provides improved process stability.

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