

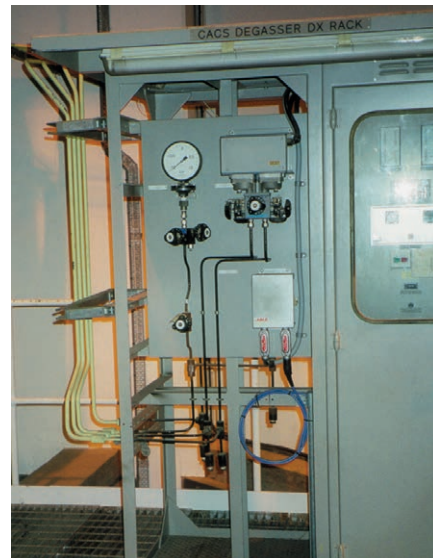
Problems Of Nuclear Proportions

ABLE Instruments & Controls Ltd recognise that data relating to the operational performance of installed equipment provides vital information relating to customer satisfaction, application suitability of equipment in addition enhanced product development...

Many company's offer either simulated data or reactive assessments of their equipment, thus problems are only perceived when a customer returns goods or seeks assistance. In the real world of process control, where a user may well replace non-functioning equipment without notification, this type of information is marginally useful at best. As such we believe reliability of instrumentation has to be assessed in the context of the application in order to produce meaningful MTBF information and to this end ABLE maintains a database to track installations where possible.

A case in point is Heysham 2 Nuclear Power Station, where some seven years ago station engineers sought reliable level control. Measurement in degassers and their header tanks at a nuclear power station is at once one of the most difficult and critical measurements to make. However ABLE's application based solution has facilitated both continuous reliable performance and the development of a successful measurement system for this particular application.

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At the station, there are several recirculating loops – gas circulator auxiliary cooling system, reactor bypass gas plant, diagrid support skirt and pressure vessel cooling, etc. The degassers remove hydrogen and oxygen released as the cooling water undergoes radiolysis.

Basically, continuous bleeds are taken from the pump discharge headers of each cooling circuit and sprayed into the degassers. However since the Degassers are maintained at 85mbar absolute, regulation of make-up water, via a level control valve, was not trivial.

Tightly defined limits are necessitated, with the 4 – 20mA signal ranging from -100 to +100mm with a control band of 10mm. Previously, a standard differential pressure transmitter was used with a fixed reference head of the process fluid. However, due to the high ambient temperatures and the low pressure, the reference head boiled off – making it a variable, and causing the level monitoring and thus control to become inaccurate and erratic.

The replacement had to use existing tapping points on the degasser, and fit in with existing electronics

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"The Drexelbrook Admittance probe system of level detection has proved to be a complete success. The system has remained maintenance free since commissioning and continues to give an accurate measurement of Degasser level".

Steve Mc Gowan, Reactor Systems Engineer

– not least because the degasser was classified as a pressure vessel, with all the attendant statutory regulations.

Other criteria for the system included: air temperature range of 18 to 45 °C, in vacuum operation, RF immunity, signal damping to handle the vigorous internal process boiling and saturated vapour resistance. On-line calibration checks were also necessary, and the device had to fit into a local panel.

Alternative methods that had been previously trialed included differential pressure using a dry leg or diaphragm seal, ultrasonics and capacitance - all of which were flawed in this application. Dry leg DP suffered condensate build up during plant shut down: diaphragm seal DP with its long capillary runs was not appropriate, ultrasonic's couldn't handle the vacuum: capacitance suffered from the effects of steam and condensate within the vessel.

Significantly each of the manufacturers had boasted high MTBF (mean time between failure) figures, all of which were totally unrelated to the applications Heysham sought to control.

Consultation with ABLE application engineers led to the selection of specialised RF Admittance systems. ABLE and Heysham after extensive testing saw the universality of the RF Admittance system as the key to providing continuous uninterrupted and above all reliable service. The eighteen systems finally installed handled all of the constraints previously described whilst simultaneously making measurements independent of density, chemical composition, viscosity, product build up and electrical properties. These instruments have been in operation now for in excess of seven years and continue to provide accurate maintenance free measurement, Steve Mc Gowan Reactor Systems Engineer for Heysham 2 commented that "The Drexelbrook Admittance probe system of level detection has proved to be a complete success. The system has remained maintenance free since commissioning and continues to give an accurate measurement of Degasser level".

In conclusion there are numerous reputable instrumentation manufacturers who supply a multitude of instrumentation, most of which is designed to high standards, as such the finite reliability of the product is rarely challenged. Therefore a clearer indication of potential instrumentation reliability is the analysis of historical data from relevant applications coupled with a vendors ability to provide true application based engineering solutions.

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