Case Study

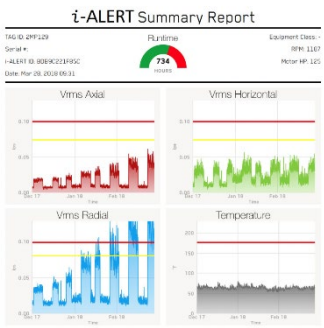
i-ALERT®

Application: Nuclear Power Plant

Continuous condition monitoring proves its worth in nuclear power plant.

Problem

A nuclear power plant in the process of a multi-year shut-down program uses vertical turbine pumps to circulate cooling water. To help evaluate their performance, the pumps were fitted with i-ALERT2® equipment health monitors. These tiny sensor measure tri-axial vibration (with spectra), tri-axial kurtosis, temperature and run-time hours every five minutes. Data is retrieved via a wireless Bluetooth® link. Unlike “snapshot” data collected by handheld vibration test equipment, i-ALERT2® provides continuous data, 24/7/365. Following the recent removal and repair of one of the pumps, the i-ALERT2 detected elevated vibration amplitudes due to a 1x resonance. Each time the pump would turn off and on it would grow larger. If uncorrected, this situation would have eventually led to pump failure.



The i-ALERT2 revealed radial vibration increasing over time.

Conclusion

Preliminary testing indicated that all four of the plant’s water cooling pumps had insufficient frequency separation margin due to the metal base structure. This is obviously an important issue to come to light in a nuclear power plant. The fact that the situation was first discovered by i-ALERT2 is testament to the vital role that continuous condition monitoring is playing in the plant’s maintenance program.

Clearly, the i-ALERT2 is adding a valuable margin of safety to the operation of the power plant—as it continues to do in numerous other industrial applications.

Recommendation

Investigation suggested that a reduction in joint stiffness when the pump was reinstalled may be causing the resonance. There were indications that the pump/base joint was degraded. Modifications were made to improve the frequency separation margin by altering the structure’s natural frequency away from the running speed of the motor.