Case Study

i-ALERT®

Application: Powerplant

Repeated condensate pump failures resolved using continuous monitoring data.

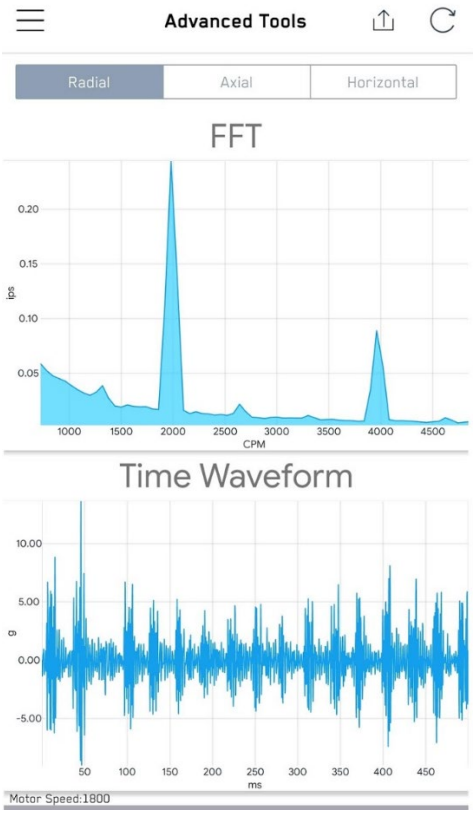
Problem

A geothermal powerplant in the California desert was plagued by frequent failures of their condensate pumps. On average the bearings and mechanical seals needed to be replaced every two weeks and this was costing the company about $3,000 per pump per repair. The condensate from the plant's turbines was clean, so this was normal service for this kind of pump. The reason for the failures was therefore not obvious and warranted deeper investigation.

Finding the root cause

The bad actors had recently been repaired by the ITT PRO Services Shop in Los Angeles and at that time i-ALERT2® machine health monitors were placed on them. These tiny sensors track tri-axial vibration (with spectra), tri-axial kurtosis, temperature, and run-time hours 24/7/365.

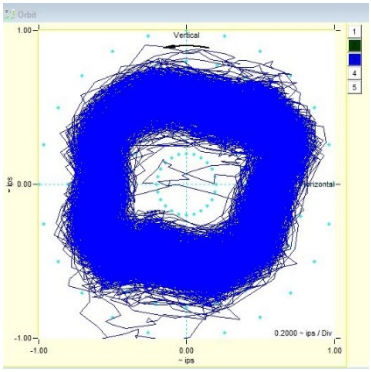
Data retrieved via their wireless Bluetooth® link indicated that a serious vibrational issue had developed. Thermal imaging revealed that the bearing housing was running at an extremely hot 2350, so the bearings were certain to soon fail once again.



i-ALERT2 vibrational data indicated that failure was once again imminent.

Thermal imaging revealed that the bearing housing was running extremely hot, making failure imminent.

ITT Solutions Engineering took further vibration, flow and pressure measurements and quickly concluded that this was a straight-forward operational issue: the pumps were running way back on their curves. Knowing that low flow situations were a possibility, the company had installed recirculation lines, but they were inadequate because they weren't sized appropriately. In actuality the pumps were about four times larger than they needed to be for this application. And that was the root cause for the repeated bearing and seal failures via excessive thrust loads.



High density triaxial accelerometer data produced this bearing housing orbit. Its lack of circularity indicated a machine problem structurally as well.

Solution

Drop-in replacement pumps were recommended using standard Goulds hydraulics and parts. Custom casings were made to match up to the same suction and discharge locations. The hydraulics are now correct for the service. Because the pumps are right-sized, they are putting the correct loads on the bearings and failures have ceased.

If the company had been using i-ALERT2 all along, they would have caught this issue and shut down the machines before the failures. All of which demonstrates the value of continuous pump monitoring and the substantial amount of time and money it often saves the user.