PROJECT

Renewable NRG Systems worked with a large wind turbine owner in North America to demonstrate that the TurbinePhD™ condition monitoring system can detect faults early and reduce maintenance costs. The owner installed TurbinePhD systems on three multi-megawatt wind turbines on the same wind farm; two of the turbines had no faults, while the third had a fault somewhere in the drivetrain. Renewable NRG Systems had no knowledge of which turbine was faulted or whether the faulted component was a bearing, shaft, or gear.

OBJECTIVE

TurbinePhD is designed to identify faulted components early so that predictive maintenance actions can be performed, reducing the cost of repair. TurbinePhD cost-effectively turns large quantities of vibration data into actionable information by combining advanced vibration processing techniques leveraged from the rotorcraft industry with a patented automated diagnosis capability. The web-based user interface then displays the health of all the turbines using a traffic light display, allowing users to access their data anywhere they have an internet connection and quickly determine which turbines need attention.

RESULTS

TurbinePhD determined which turbine was faulted and which component needed replacement. The graph above shows the high speed bearing fault trending through time as the fault becomes more severe. The fault trend crossed the watch threshold in early April, and then crossed the warning threshold two weeks later. A borescope inspection was carried out almost two months after the initial detection. The inspection revealed a small axial crack on the inner race of the bearing (see the inset image above).

BENEFITS

An up-tower repair of the faulted high speed bearing was performed 10 days after the borescope inspection revealed damage. The turbine was taken out of service, repaired and brought back online in less than 10 hours, minimizing the resulting down time and lost production, all without the use of a crane. Catching this one high speed bearing failure saved the operator an estimated $250,000.

For more details on how TurbinePhD caught this high speed bearing fault and the how the cost savings were realized, read the full case study in the download sections of our website:

www.rnrngsystems.com/TurbinePhD