CASE STUDY: Continuous Partial Discharge Monitoring Detects Manufacturing Defect Within Warranty Period

Company:	Confidential
Plant:	Air separation plant in South Carolina
Unit:	Confidential
Ratings:	13.8kV, 14000HP, and 1200RPM, Synchronous
Manufacturer:	Confidential
Related Info:	Global VPI, Class 'H' insulation, rewound in 2000, 26 starts over 18 months
PD Sensors:	3 EMC's connected to a MotorTrac continuous monitoring system

Details: When this motor was rewound in early 2000, the decision was made to install an Iris MotorTrac Continuous PD Monitor. During the first few months of operation, the partial discharge levels displayed a slight downward trend, common during the 'settling-in' period for a new winding. Within about six months however, the motor started to display an upward trend in PD activity, particularly on 'A' phase. In the latter half of 2003, this trend accelerated with PD levels on 'A' phase going to 2.5 times their original levels, while 'B' phase, although slightly erratic (possibly due to fluctuations in ambient conditions such as humidity) was also up by approximately 50%.

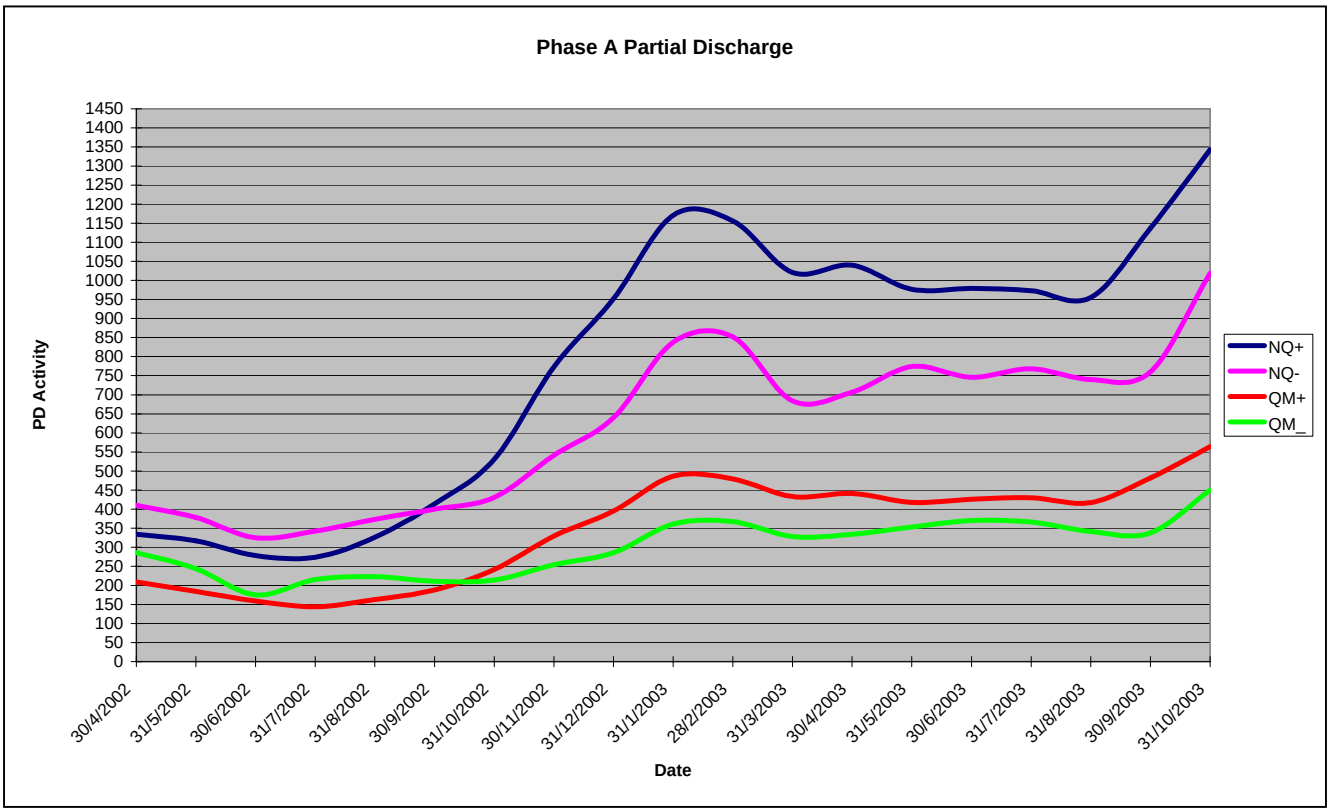

Figure 1. Trend Data For 'A' Phase as Gathered By MotorTrac Continuous PD Monitor

The owners of the machine contacted Iris Power Engineering for a quick assessment of the data. Iris confirmed that there did appear to be an active failure mechanism and recommended a test with a TGA-B to locate the source of PD. The customer decided to try and locate the source of this rapidly increasing PD through a visual inspection instead. The site of PD activity was easily located. It appeared as leaking 'varnish' from between the coils near the slot exit, yielding high PD. In addition, the slot semicon coating appeared to be missing or ineffective.

Figure 2. One of Numerous Sites Where PD Activity was Apparent

As the motor was still under warranty, the owner decided to swap the motor out with a spare unit and have the manufacturer rewind the stator. Thanks to the early warning of developing stator problems gathered through continuous PD monitoring, this customer was able to arrange for cost-effective warranty repairs while avoiding the high costs and loss of production often associated with an unplanned outage.