

CASE STUDY: Pulse Phase Analysis (3D and polar plots) indicates end arm PD activity.

- Company:** A New Zealand utility
- Plant:** confidential
- Unit:** hydrogenerator
- Ratings:** 44.44MVA 0.9pf, 11.0kV
- Manufacturer:** confidential
- Related Info:** thermoset multi-turn winding installed in 1976
- PD Sensors:** 2 capacitive PD couplers per phase

Details: The winding of the unit has variable end arm clearances which can lead to phase-to-phase PD between line-end coils in different phases. PDA-IV testing was commenced in 1994. 3D and polar data plots from Phase C show dominant phase-to-phase PD activity. All other phases showed phase-to-ground PD activity was present. The comparison 3D data plot shows the PD activity is related to phase voltage, with low-level phase-to-ground PD activity present. The January 1996 3D and polar plots indicate end arm activity is present (60° shifted, distributed about the 285° and 105° axis). The December 1996 data shows that this activity has disappeared. The data is now distributed about the 225° and 45° axis. Between these tests the unit's stator winding was cleaned and efforts to reduce carbon dust and oil mist deposits were implemented.

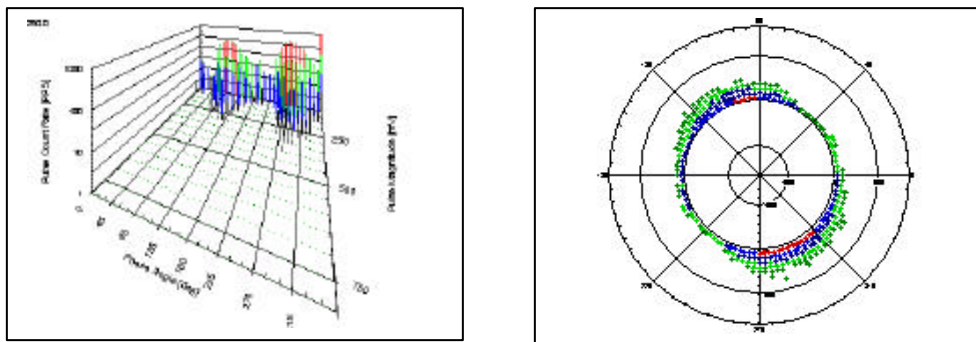


Figure 1: 3D and polar plots from January 1996 on-line PD tests

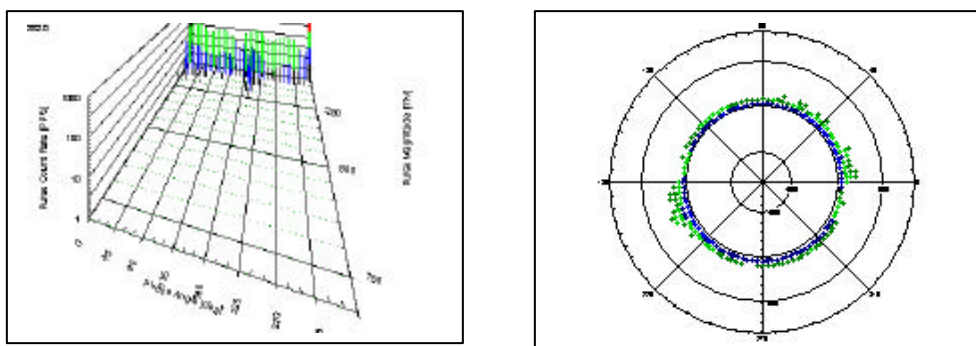


Figure 2: 3D and polar plots from December 1996 on-line PD tests