

DETECTING PARTIAL DISCHARGE

Detecting Partial Discharge (PD) requires extensive experience and equipment suitable to undertake measurements on live In-Service High Voltage Equipment.



Termination failure in process (21-12-07)



Failed AEI circuit breaker



Generator Termination failure in process (21-1-08)



Termination failure in process (21-2-08)

Before a Partial Discharge Engineer can locate and combat Partial Discharge, it is essential to have a good working knowledge and extensive experience of what he is up against. Not knowing the enemy can result in disaster!

For the asset owner, the most important step would be to firstly budget for annual surveys to be undertaken using an experienced and capable field contractor used to operating in all aspects of the high voltage cable and switchgear industry.

WORST POSSIBLE ACCIDENTS

Both switchgear and cables represent a significantly large investment. An incorrect diagnosis can greatly increase the possibility of personnel hazard and asset damage. Those who have been close to an explosion of either a piece of metalclad MV switchgear or cable termination in the confines of a substation would need no convincing that what we are talking about here, is one of the worst possible accidents.

Would you compromise the safety of your staff by believing this can be done in-house by untrained or inexperienced staff? Unless companies have the significant resources and technical expertise to make the call on what is normal or abnormal (on all makes and models of equipment), getting it wrong can result in a very serious crisis! ⚡

CASE STUDY

A recent On Line Partial Discharge Survey of a Central Business District network (New Zealand) showed an 11kV feeder with two locations of high partial discharge. By using PD detection and mapping of cables it was possible to locate the source of this discharge:

- One source was a pitch filled joint
- The second source was a pending oil filled switchgear failure.

We advised the client that the oil filled switchgear had a higher probability of failure compared to the paper lead pitch filled in-line joint. A planned outage occurred and the suspect switchgear was replaced.

A second PD survey was carried out which showed the levels of Partial Discharge had reduced. This allowed rescheduling of repairs to the joint until suitable access / loading had dropped (it was not possible to cut off the load to the cable).

SUMMARY

Operations were then advised of the pending power failure. This allowed operations to offload the feeder concerned, and back supply load via a healthy electricity supply, leaving electrical maintenance crews to attend to defects identified in the Partial Discharge report.

Oil filled Switchgear

Pitch filled joint

