

INTERMITTENT PARTIAL DISCHARGE DEMANDS A DIFFERENT PHILOSOPHY

An annual Location survey or 'spot check' for Partial Discharge while in service and under normal operating conditions is recognised as a cost effective method to assess the ongoing health of your HV Switchgear, with the financial savings from avoiding a single outage easily offset by the OPEX spend, not to mention other regulatory incentives.

Given the relatively short measurement window a regular period of Continuous Monitoring can identify intermittent activity which may be dormant during any site visit, and provide a greater level of confidence in your critical distribution equipment. It can also be of benefit in excessively noisy environments as these devices, designed for permanent or semi-permanent installation are able to better cope with, and discriminate between genuine internal discharge and external background interference with greater accuracy.

ENVIRONMENTAL FACTORS

To roll-out a network wide inspection program, a period of 7 days per site is often sufficient to confirm the presence of erratic activity, itself often dependent on environmental factors such as Temperature, Humidity and Voltage variations as a result of changes in the Loading. Frequently PD will begin life in this way before the inevitable insulation deterioration increases its severity, and ability to remain active for longer periods eventually manifesting into an avoidable incident.

CASE STUDY

In this example an innocuous looking leak in the roof above a pair of Switch assets was revealed in 2014 as being a potential failure site despite an acceptable Location survey result earlier that same month. The Summary table to the right clearly identifies Channel 7 with 54% of total pulses allocated, Pulses per cycle of 2.747 within the range to be considered genuine and a Maximum recorded Amplitude of 25dBmV leading to a short Term Severity of 49, where anything greater than 100 is of concern.

The Pulses 'first' graph illustrates the genuine TEV activity located on the Termination Box along with separate and lower levels of external interference

from the Local Ripple plant correctly apportioned to Aerials 11 and 12 (top right on adjacent page). It also conveys just how seldom it was present meaning one would be very lucky to strike it active during a 'spot visit'.

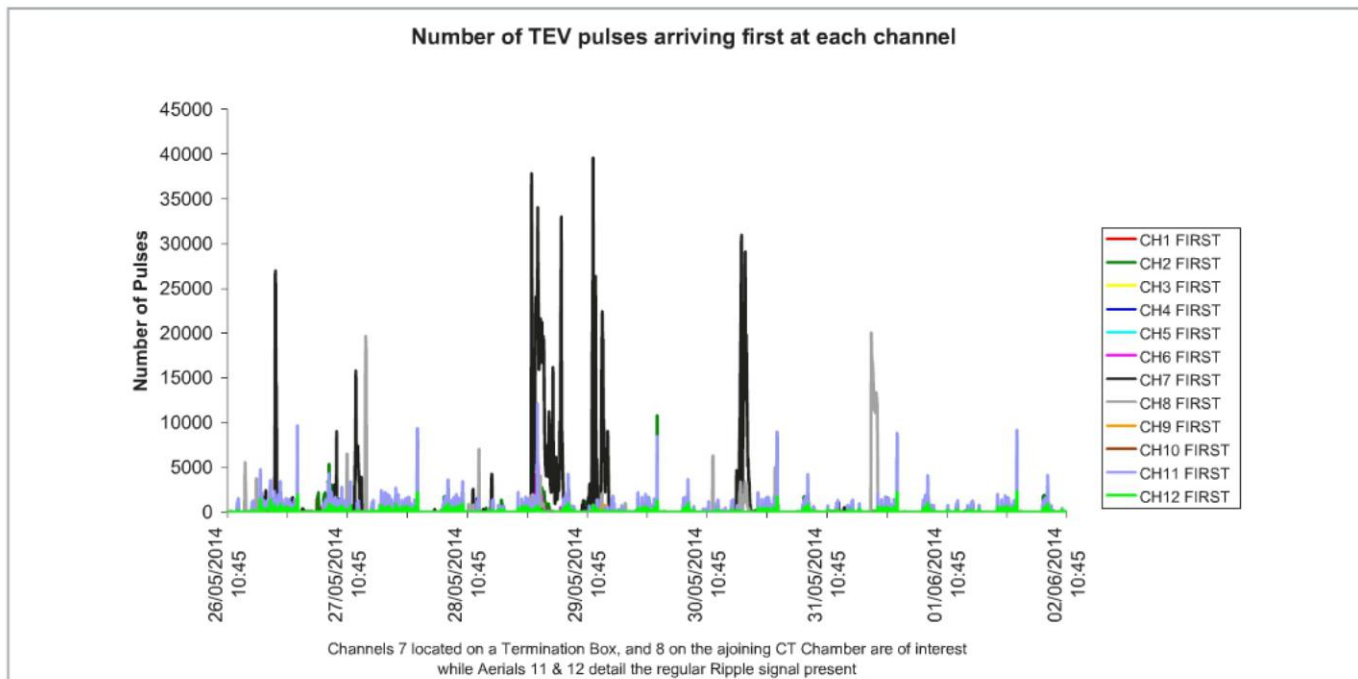
REPETITIVE MOISTURE INGRESS

During the ensuing investigation, Water staining was evident on the termination sleeve along with signs of surface related tracking - the result of repetitive moisture ingress over an extended time frame.

Fortunately the damage was discovered at an early stage allowing for a Termination clean-up (and roof repair) rather than anything more invasive to remedy the problem.



Start time 26/05/2014 10:45:00											
Finish time 02/06/2014 10:45:00											
[----- LEVEL -----] [----- NUMBER OF PULSES -----]											
Ch	Max Level	Nos of Pulses per cycle	Av Level	Short Term Severity	Nos of Pulses	% Pulses	Max Pulses per cycle	Assoc Level	% Time	Severity Long Max Term	
Short											
1	28	0.156	3	4	67586	2	0.207	19	29	0	4
2	37	0.020	5	1	384897	11	0.746	25	37	0	13
3	22	0.140	1	2	18183	1	0.140	22	7	0	2
4	16	0.001	0	0	34	0	0.001	16	1	0	0
5	19	0.073	0	1	7680	0	0.073	19	6	0	1
6	22	0.569	1	7	100062	3	0.711	19	12	0	7
7	25	2.747	4	49	1808008	54	2.747	25	35	0	49
8	34	0.001	2	0	396705	12	1.390	16	22	0	13
9	19	0.030	0	0	8076	0	0.055	16	4	0	0
10	19	0.018	0	0	2358	0	0.018	19	4	0	0
11	46	0.052	4	10	520713	16	0.840	25	57	0	15
12	28	0.015	3	0	135287	4	0.157	16	32	0	1
Total number of pulses					= 2415						
Total number of sets of data					= 2017						
12 channels connected, 14400 cycles per 5 minutes											



Continuous Monitoring for Partial Discharge activity is used regularly by a number of New Zealand's larger Network Distribution companies and is providing excellent results for the Asset owner.

HV Diagnostic Services Ltd, based in Christchurch operates several TEV units and through their primary supplier EA Technology Australia, can access advanced Alarm and Monitoring solutions either for sale or long term rental projects.

System capabilities can include employing multiple sensor technology's, online communications and alerts when paired with a working data connection and appropriate hardware, or the option of a sophisticated Cloud based retrieval and management console making these products truly customisable and scalable for any application.



SPECIALIST Condition Assessment Services, Products & Support

Why HVDS?

- Experience with over 15 years of local NZ insight to share
- Expertise with a proven and successful track record
- Independent, knowledgeable and candid advice
- Consultancy incl. CBRM via our Australian colleagues

Core Activities

- In service PD surveys for ground mount switch assets
- Overhead Ultrasonic, UHF and IR assessment in Switchyards
- VLF mapping of Cables, Offline and accurate
- Instrument Training, basic Calibrations and Spares

Distribution Portfolio

- UltraTEV family of Testers, Alarms and Monitors, EA Technology
- Thermal Cameras - Entry level to Professional, Guide Infrared
- The Safety assured maintenance aperture system, Viewsafe UK

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Safety assured maintenance aperture
Infrared thermal imaging