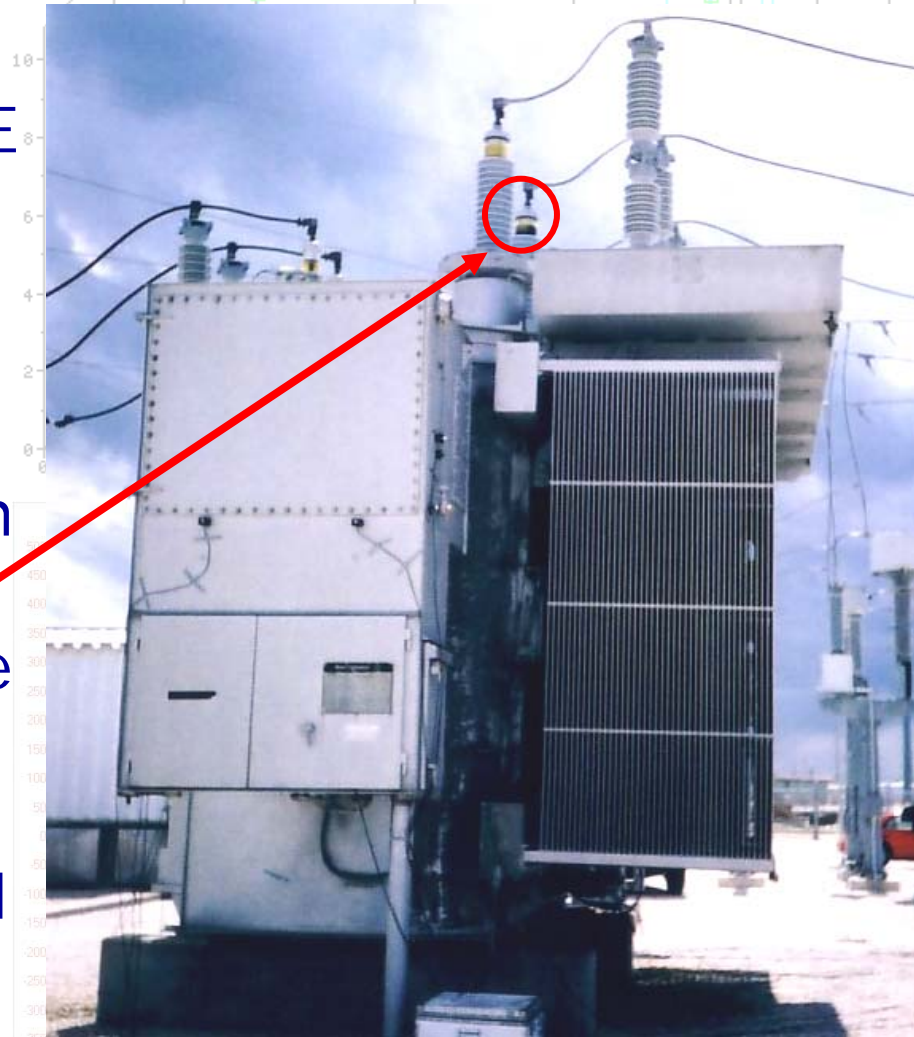


Case Study 75 - Bushing Degradation

Autotransformer, originally Westinghouse but repaired by GE in 1989. 138/69 kV, class OA/FA/FOA, 50/66/83/93 MVA, core form.

Oil on the upper part of the High Voltage bushing H2 was getting darker (looked like carbon in the oil).

HV Bushings Type O + C installed in March 2002

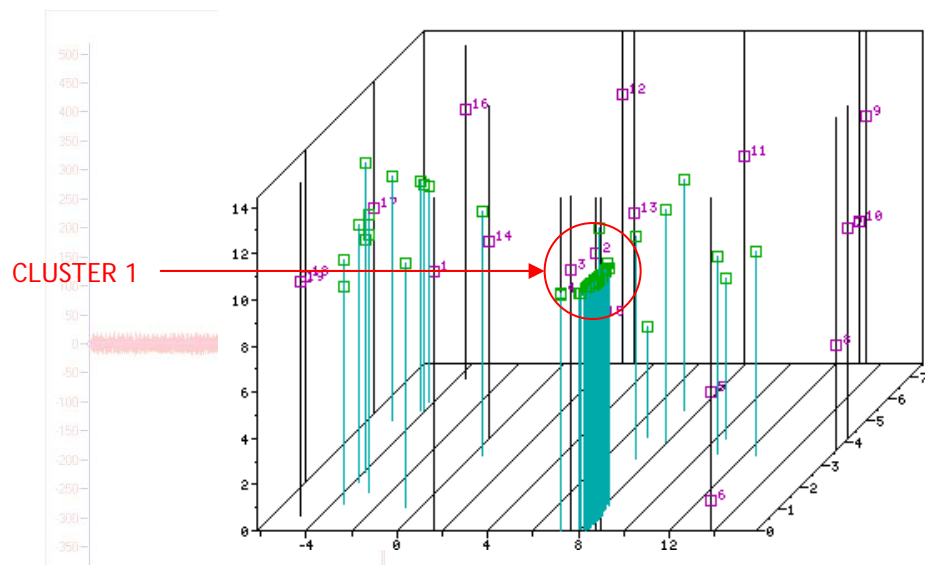


Case Study 75 - Bushing Degradation

- AE Test performed in June 2003
- No acoustic activity was expected on the main tank because the gas in oil values indicate normal operation of the unit.

DATE	H2	CO	CO2	CH4	C2H6	C2H4	C2H2	TDCG
7/23/2002	0	210	1551	6	1	15	0	232

Cluster 1 was located a few inches from the high voltage (HV) wall, right in front of where the lower part of the H2 High Voltage bushing is located.



Case Study 75 - Bushing Degradation

- Transformer removed from service for power factor testing.
- An oil sample was pulled from the bushings. A field Hydran test was performed on the bushing oil, plus a sample was sent to a laboratory for analysis.
- Results obtained are shown below:

Bushing

H1

H2

H3

X1

X2

X3

Hydrogen

28 ppm

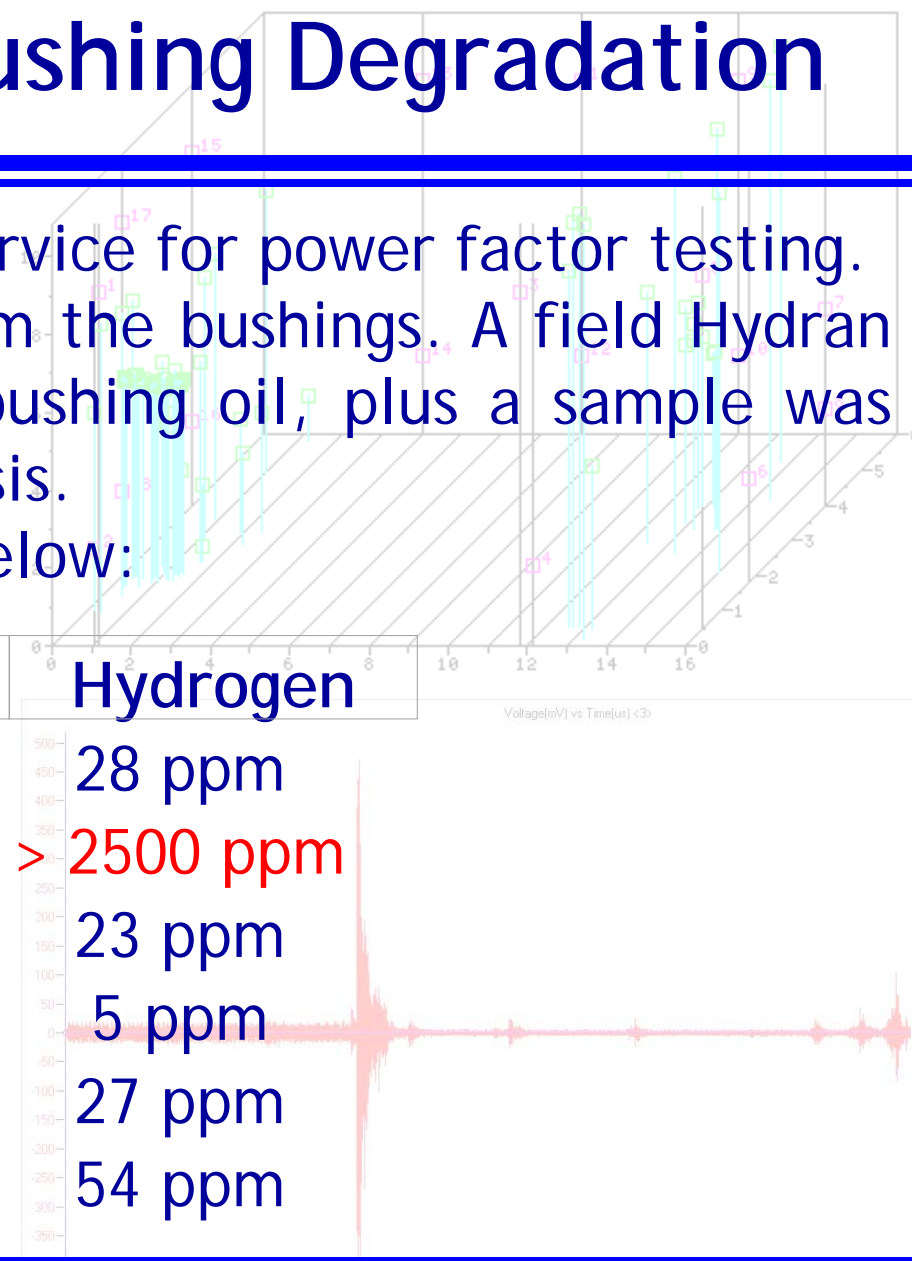
> 2500 ppm

23 ppm

5 ppm

27 ppm

54 ppm



Case Study 75 - Bushing Degradation

As can be seen, the laboratory turned up large amounts of gas on the H2 bushing. Most likely caused by PD activity.

This is the same bushing where the acoustic activity was detected on the main tank.

This bushing was removed from the transformer and sent to the manufacturer.

