

C57.104 – IEEE Guide for the Interpretation of Gases Generated in Oil – Immersed Transformers
Tuesday, November 1, 2011
Boston, Massachusetts, USA
Minutes of WG Meeting

The meeting was called to order by Chair Rick Ladroga at 3:15pm. Vice Chair Claude Beauchemin and Secretary Susan McNelly were also present.

There were 46 of 73 members present. There were 56 guests, and 12 guests requesting membership. A membership quorum was achieved. Guests attending the WG meeting for the first time who request membership will be deferred until the next meeting attended.

Guests requesting membership were (those identified with an asterisk (9 of the 12) will be added as WG members):

Paramjit Bhatia*	Shawn Luo*
Michael Botti*	Ron Nicholas*
Stephan Brauer*	Roderick Sauls*
Larry Christodoulou*	Prabhu Soundarrajan*
Humayin Taraq	Robert Tillman Jr.*
Min Jea Lee	Jane Ann Verner*

Agenda

1. Welcome & Quorum Check
2. Introductions
3. Approval of Minutes from Spring 2011 San Diego meeting.
4. Report of DGA Data collected to date: Norm Field
5. Preliminary analysis of collected data, Luiz Cheim
6. New Business

The minutes from the Spring 2011 San Diego, California meeting were approved as written.

Rick Ladroga announced that Michel Duval has been awarded the Herman Halpern award.

Review of recent activities:

Norm Field presented a report for the DGA Data TF. There were 10 suppliers of data supplying 475,000 DGA samples representing 161,500 transformers. A full copy of the presentation will be posted on the web site.

Data for outright failed transformers, not in service (spares), non mineral oil samples, and samples not from transformers were removed from the data base. Samples from OEMs, repair shops, specified as “in-bottle”, without a transformer ID or sample date, duplicate samples, and blank or nonsense data entry samples were also removed.

There was data clean up required such as V to kV, text to numeric values, sample date format, and MVA basis.

For comparison of values in Table 1 of the Guide, the individual gas concentration data was analyzed.

Luiz Cheim presented on the analysis of the database that both he and Lan Lin did. He showed a representation of the distribution of suppliers of the data, MVA, voltage class, oil preservation types, and the reason for the DGA test. Ordered statistics (percentiles) were used to analyze the data.

An analysis of H₂, C₂H₂, and CO vs age was presented. The same was also shown for voltage class, MVA rating, and source of data. The CO values were well above the IEEE limit of 350ppm in all cases. He showed the same analysis for suspicious units.

Rates of gas formation (ppm/yr) for Hydrocarbons and for CO, CO₂, and TDCG and using the Michel Duval triangular conditions were also presented. From the triangular evaluation, 10 conditions were identified with Michel Duval's assistance. For completeness, the data was evaluated using Roger's Ratios as well.

A question was asked if the WG expects to have limits based on the different ratings, age etc. Claude indicated that it is too early to determine that, but there could very well be more than one table based on age or voltage class.

Jim Thompson indicated that DGA has traditionally been used as a tool for trending. Does this data help with that aspect? The answer is that yes it would.

A suggestion was made from Joe Foldi that the data also be evaluated and compared to the IEC limits.

Rick reported that there has also been significant work on development of case studies.

Jim Dukarm gave a short presentation on DGA Survival Analysis.

Jin Sim asked about the use of artificial neural networks (ANN) to crunch the data for trending and analysis. This will have to be discussed and reviewed.

The meeting was adjourned at 4:30 pm.

Rick Ladroga
WG Chair

Claude Beauchemin
WG Vice-Chair

Susan McNelly
WG Secretary