# CIGRE Study Committee B3
# Terms of Reference: **SF6 analysis for AIS, GIS and MTS condition assessment**

| | |
|---|---|
| Working Group No. & Title: | WG B3-25 **SF6 gas analysis for AIS, GIS and MTS condition assessment** |
| Working group convener: | Eamonn Duggan/Ireland |

| | |
|---|---|
| Title of proposed activity: | SF6 gas analysis for AIS, GIS and MTS condition assessment |
| Organization: | B3-AA2 |
| Proposed on behalf of WG by: | AA2 |

**Scope of the work**

Experience has shown that High Voltage gas insulated switchgear can have a useful life considerably longer than initially envisaged when the switchgear was produced. Therefore condition assessment of the switchgear and the correct interpretation of the results have increasingly become more important. A critical decision is the selection of the right moment for any intervention, i.e. to prevent a violent failure and simultaneously to avoid unnecessary internal inspections of the equipment (from outage avoidance as well as environmental impact points of view). The analysis of the SF6 or mixed gas composition is a very common diagnostic method used for gas insulated switchgear (GIS) as well as for any other equipment filled with SF6 or mixed gas (live tank CB, dead tank CB, MTS, instrument transformers, etc.). Notwithstanding the considerable amount of analysis of SF6 undertaken the interpretation of the results is not standardized and frequently the recommended limits for contaminants vary depending on who undertakes the analysis.

The aim of the work will be to provide the asset manager with the following information:

- When can insulating gas analysis be applied most effectively (e.g. for assessment of dielectric tests results, to identify the location of internal flashover fault, to identify the appropriate method for disposal of contaminated gas, to avoid the unnecessary the internal inspection of equipment, to profile the long term behaviour of switchgear, or instrument transformers, to determine contacts and Teflon cone wear, to identify the presence of PD, hot spots, extreme loadings, insufficient contact between parts at the same potential )?
- What characteristics of the gas insulated switchgear can influence the content of the insulating gas (e.g. equipment with/without switching function, influence of different types of filter materials, impact of different sizes of gas chambers, impact of different kinds of service conditions and maintenance practices)?
- What are the most appropriate gas components to analyze (primary, secondary and tertiary SF6 decomposition products, CF4, gas and solid substances, etc.)?
- Investigate the build-up of moisture over the years in SF6 enclosures that are positively pressurized and do not undergo any internal maintenance
- What values of individual substances identify an acceptable/deteriorated/post fault condition?
- What are the most appropriate test methods/instruments to use for gas analysis?
- Analysis the interaction between decomposition products and greases/lubricants, moisture and residual oxygen.

The results of this work will provide the asset manager with guidance as to the interventions required to ensure the satisfactory performance of AIS, GIS and MTS and hence prevent major failures, minimize planned outages and thus increase network reliability and availability.

**Deliverables**

The work will be finalized with a brochure and a short report in ELECTRA.

**Time Schedule**

After its approval and the constitution the WG will start working. The brochure can be available within app. 2 years.

**Target groups**

Substation management, operators, service staff, consultants, asset management staff, IEC and IEEE standard maintenance teams

Approved by TC Chairman: Klaus Fröhlich          Date: 02/07/2009