WEIDMANN
ELECTRICAL TECHNOLOGY

Weidmann-ACTI Inc.

Maintenance/Liability Cost Savings

Dissolved Gas Analysis, DGA, has been accepted on a worldwide basis, as a valuable diagnostic tool for power transformers. DGA will work with any size transformer filled with dielectric fluid. It is applicable to the largest GSU transformer and the smallest distribution unit. The decision as to which units will be tested is based on economics and importance in the electrical system. Thus, it has always been possible to use DGA as a diagnostic tool for network transformers. In the past, most network transformers were not evaluated with DGA because of the perceived analysis costs and the relatively affordable transformer replacement costs. This protocol did not consider the liabilities associated with a network transformer failure that resulted in personal injury. Several utilities have experienced network transformer failures in densely populated metropolitan areas that have resulted in injuries to citizens. The resulting liability payments would have paid for decades of diagnostic testing that may have prevented these accidents.

Prudence dictates that utilities should use testing procedures to evaluate their network transformers. Liability will be decreased and at the same time network reliability will be increased. A diagnostic testing program for your network transformers is an inexpensive investment with a high rate of return.

Network Transformer Recommended Diagnostic Tests

Dissolved Gas Analysis Hydrocarbon (mineral base) oils and silicones are used as insulating fluids in network transformers because of their high dielectric strength, heat transfer properties and chemical stability. Under normal operating conditions very little decomposition of the dielectric fluid occurs. However, when a thermal or electrical fault develops dielectric fluid and solid insulation will partially decompose. The low molecular weight decomposition gasses include, hydrogen, methane, ethane, ethylene, acetylene, carbon monoxide, and carbon dioxide. These fault gases are soluble in the dielectric fluid. Analysis of the quantity of each of the fault gases present in the fluid allows one to identify fault processes such as corona, sparking, overheating and arcing.

Water in Insulating Fluid Small droplets of water suspended in insulating fluid can decrease the fluid's dielectric strength. A decrease in dielectric strength may result in lowering the voltage amount the oil can withstand without failure. This test measures all forms of water in the sample.

Acid or Neutralization Number Acids are generated when oil is oxidized. Acids attack the paper insulation, react with metal surfaces and form sludge. This test shows how much acid is present and indicates the possibility of sludge formation, but not that sludge actually exists.

Interfacial Tension This test indicates the presence of polar contaminates such as acids, varnishes, paints and paper fibers which are oxidation products.

Color Number The color number of insulating fluid may indicate deterioration or contamination by foreign materials. Color numbers are used to monitor the service life of the fluid.

Visual Examination Any deviation from clear and sparkling may indicate the presence of free water, particulate or sediment. This test includes the visual exam for suspended and sedimentary contaminates.

Dielectric Breakdown The dielectric breakdown of insulating fluid indicates the voltage at which the dielectric fluid breaks down. Water, oxidation products and foreign material will reduce the fluid's resistance to dielectric breakdown.

Weidmann-ACTI can assist you with the development of your testing criteria. Our report will provide diagnostic recommendations for your review. Test results are available via phone, fax, e-mail and on the web.

For more information about our Engineering and Diagnostic Services, Products and Systems, contact a Weidmann Representative by phone at 800-242-6748 or 802-748-3936, by fax at 802-748-8630, by e-mail to service@weidmann-systems.com or visit our website at www.weidmann-acti.com