

Task Force Natural Ester Fluid DGA Guide Development
Tuesday, March 18, 2008
Charlotte, North Carolina

Attendance 79 total attendees 32 attendees requested membership 47 attendees were guests

1. Preliminaries

John Luksich, Cooper Power Systems agreed to be the committee secretary.

2. Task do we need a DGA guide for Natural Ester Fluids?

Determine if the current mineral oil insulating fluid evaluation tools are sufficient to evaluate natural ester fluid DGA or if a new guide is required.

3. EPRI Project Presentation by Luke Van der Zil

4. DGA interpretation in natural ester fluids

- a. This project looks at one fluid, Nitrogen head space, and thermally upgraded paper. EPRI would like to expand the scope in future projects.
- b. First step was to establish the partition coefficients
 - Did 10 trials with mineral oils and received similar results as with published data, so confidence in the method is high.
 - The coefficients for the natural ester fluid will need to be determined for coil in mockup transformer.

Question: Was a thermal degradation test similar to the Westinghouse test on Octane over a wide temperature range? No

Question: What is the discharge energy used in the partial discharge cell? It has not been constructed yet but plans a range of energy levels when the tests begin.

Question: 300 to 500 pico-coulombs is an expected design criterion for mineral oil transformers so will it also be used for Natural ester fluids? EPRI wants to see how mineral oil differs from natural esters over a wide range of energies

Question: How will this affect the time limitations for the project? Future projects can extend the data gathered by this project.

Question: What is the electrode design and configuration used, Parallel plane, plane and point, etc.? Design has not been determined but considering both

Question: How is the measurement of the temperature done? Thermocouple at the point of heat source in fluid.

Question: Is the fluid flow natural circulation like in a smaller transformer? Fluid flow is pumped through system.

Question: Is the system pressure monitored? Flow volume is low

Question: Is the temperature gradient measured? Temperature gradient surrounding the heat source is not measured but the differential temperature between the simulated hot spot and the transformer hot spot is.

Question: Partial discharge intensity will affect the production of gases but will ratios will be similar? Agree, this is part of the test.

Question: How many in the group have natural ester fluids in transformers (addressed to committee)?

Recent incident involving 230kV transformer with soybean natural ester fluid was presented by Paul Boman.

A CIGRE task force compared synthetic ester and mineral oil fluids. It found the gas patterns are similar.

Ostwald Absorption Coefficients: Claire Claiborne, ABB stated that most of the Olin fluid type Oswald coefficients are similar to mineral oil and soybean fluid types but the acetylene is double the mineral oil.

Statement Stan Lundgride; Carbon dioxide gas concentration varies due to absorption into the cellulose material and diffusion into the headspace due to temperature changes.

Summary and expectations defined

The draft of the framework will be sent out shortly for review and comment.

A motion for adjournment was received from Joe Kelly and seconded by the committee

Paul Bowman
TF Chair