

# WEBINAR ON NEW METHODOLOGIES FOR ANALYZING TRANSFORMER DGA RESULTS

BEM APPROVED CPD/PDP: APPLYING REF. NO.: APPLYING



**SPEAKER: MR. RANDY COX**



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**10TH AUGUST 2021, TUESDAY**  
**9AM - 11AM**

**Registration Fees**  
**(effective 1st August 2020)**  
**Student Members: FOC**  
**IEM Members : RM 15.00**  
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# **SYNOPSIS**

The industry at large is extremely proficient at diagnosing transformer condition within mineral oil filled power transformers via dissolved gas analysis (DGA). There are many tools to assist in this process, such as Duval's Triangle, Rogers Ratio, etc which are well known and often described in detail in various literature, guidelines, standards. In spite of this, continuous return on experience allows us to uncover more practical relationship between DGA results and transformer condition.

In this presentation, we will share GE's findings on two topics related to transformer DGA assessment. The two topics are:

## 1) Categorizing Transformer Faults Utilizing the Carbon Oxide Ratio

While DGA is a reliable tool for general transformer temperature condition within the mineral oil, identifying exactly where the overheating is taking place continues to remain relatively a mystery for the most part. It is also noted that there have been some transformers which have suffered a winding failure with no historical DGA evidence of overheating prior to failure. This is not to say that overheating didn't occur prior to failure, but rather the last laboratory sample collected did not reveal any overheating, and the problem seemed to develop so quickly that the outage came as a surprise to all.

It is the intent of this presentation to demonstrate a method utilizing the historical carbon dioxide and carbon monoxide ratio to solve this puzzle and do it with greater accuracy than previously believed possible. By trending the carbon oxide ratio, the user will be able to qualify problems with heavy paper (such as a winding), light paper (such as a lead) and bare-metal connections (such as a De-Energized Tap Changer).

## 2) On Load Tap Changers Dissolved Gas Analysis

Many utilities today employ dissolved gas analysis (DGA) as the diagnostic tool of choice as it relates to the internal condition of the main tank of power transformers. During this process the on load tap changer (OLTC) often becomes overlooked as many continue to rely solely on time-based maintenance. While hot metal gasses are relatively known and understood by the industry as they relate to the main tank of power transformers, the on load tap changer continues to be problematic for many. In this presentation a comprehensive, simplified method for determining developing problems within an OLTC will be provided, which includes overheating contacts, bandwidth issues, control relay problems and breathing vs non-breathing OLTCs, as well as how a complementary program of DGA and maintenance are most effective.

# **SPEAKER'S PROFILE**

Mr. Randy Cox is the Domain Expertise Manager for GE Grid Solutions, Asset Monitoring & Diagnostics. His current duties include interfacing with the industry, committee work and education of customers on the technical advantages of GE M&D technology, products, software and solutions.

Prior to being employed by GE Energy, Randy was employed by SPX Transformer Solutions, Inc. as the Operations Supervisor for the Texas Service Center, which included staffing and implementing a new service center to perform transformer installations, repair and LTC maintenance.

Prior to this Randy was employed by Oncor Electric Delivery for 29 years with Oncor's Dallas District. Randy was the Diagnostic Technician Operations Supervisor, responsible for district reactive, emergency, maintenance and diagnostics. In addition to this, Randy held the position of Transmission Chairperson for the Oil & SF6 Diagnostics Committee and the Diagnostic Testing Training Committee for Oncor's 18 Transmission districts at the time.

Mr. Randy is also a current member of IEEE and a Fellow at GE.