

WESTCO Electrical & Equipment Corp. Case Study

Dissolved Gas Analysis (DGA): A Critical Diagnostic Tool for High-Voltage Asset Integrity

✈️ How Proactive Dissolved Gas Analysis (DGA) Turned an Imminent Failure into a Scheduled Repair.

The following case study from WESTCO Oil Laboratory emphasizes the crucial role of **Dissolved Gas Analysis (DGA)**— a key component of our Insulating Oil Testing Services— in preventing the million-peso loss of a thermally-stressed power transformer. Timely DGA provided the critical condition-based maintenance data needed to avert a severe operational disaster.

🔧 The Challenge: Extreme Thermal Stress and Undiagnosed Faults

The client's **power transformer**, presented with alarming external symptoms, is experiencing extreme operational temperatures requiring supplementary industrial cooling. Without internal diagnostic data, the unit faced a high probability of catastrophic failure, including fire or explosion, due to the buildup of flammable decomposition gases and the safety hazard posed by the overheating insulating oil.

- 🚨 **Undiagnosed Risk:** The internal health and integrity of the insulation system were unknown, but the external heat indicated **imminent failure** due to severe thermal and electrical faults.
- 📋 **Safety and Asset Risk:** The excessive thermal load and potential for internal arcing posed a direct safety risk to personnel and jeopardized a high-value asset, underscoring the immediate need for **protection and testing services**.

CONDUCTING TESTS ON YOUR INSULATING OIL CAN GIVE YOU A PROPER HEALTH ASSESSMENT OF YOUR POWER ASSET.

Talk to our experts now and inquire now about scheduling a **WESTCO Insulating Oil Analysis** to protect and preserve your power assets.

Engineered for a Secure Future



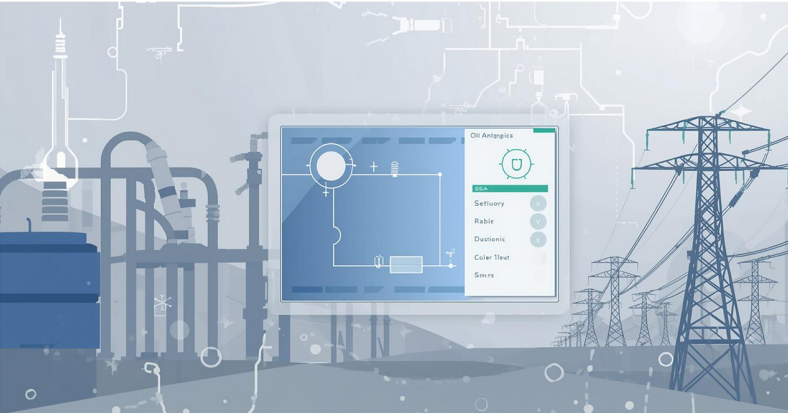
✓ The Solution: Non-Intrusive, Live-Load Fault Diagnostics

- ✓ WESTCO's **Insulating Oil Laboratory**, equipped with state-of-the-art equipment and experts, performed a comprehensive **Insulating Oil Testing Service**, prioritizing **Dissolved Gas Analysis (DGA)** as the immediate diagnostic tool.
- ✓ 🔍 **Dissolved Gas Analysis :** This advanced testing method measured the concentration of fault gases (**in parts per million (ppm)**) dissolved in the oil, which are products of the oil's molecular breakdown due to **thermal or electrical stress** within the transformer.
- ✓ 🕒 **Zero-Downtime Sampling:** Crucially, the oil sample was extracted while the unit was still operating under load, providing an **immediate diagnosis** without requiring a forced shutdown—a major benefit for **continuous thermal monitoring** and operation.
- ✓ 🏆 **Critical Finding: Above Condition Four:** The DGA results indicated an **extreme fault gas level**, classifying the transformer's health as **above Condition Four** on the IEEE standard scale—the highest level of severity. This pinpointed severe internal degradation, strongly suggestive of arcing and/or extreme **overheating** due to a high-energy fault.

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The Impact






Business Result:

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Catastrophic Failure Avoidance: Early detection of high-energy faults (e.g., arcing) via high C₂H₂ and H₂ concentrations prevents explosion/fire, saving the client the cost of a multi-million-peso asset replacement.
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Optimized Asset Management: Real-time monitoring data enables a transition from reactive emergency response to predictive maintenance, mitigating unplanned downtime and optimizing operational budgeting and planning.
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Targeted Intervention: DGA interpretation (e.g., using Duval's Triangle or Rogers' Ratios) identifies the type of fault, leading to precise, small-scale repairs (e.g., simple bad welds/connections) instead of an entire unit overhaul.



Technical Result:

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Early Fault Detection: DGA quantifies gases produced by incipient faults (e.g., partial discharge, low- and high-temperature overheating of oil or cellulose insulation), providing time recognition to intervene before complete breakdown.
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Fault Location and Type: Specific gas ratios correlate to specific fault types (e.g., C₂H₂ for arcing, C₂H₄ for hot metal, CO/CO₂ for cellulose degradation), guiding technicians to the exact problem area.
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Condition Monitoring Index: The Condition Four classification dictates an immediate escalation of surveillance and the scheduling of an internal inspection, confirming the unit's poor overall health status.




Conclusion:

The utilization of advanced testing methods like Dissolved Gas Analysis (DGA), provided by WESTCO Insulating Oil Laboratory - Your Trusted Partner in Transformer Oil Analysis, is vital for implementing preventative maintenance strategies. It reduces power transformer hazards and risks by identifying incipient faults like overheating and partial discharge in the insulating oil, thereby ensuring the long-term reliability and longevity of your equipment.

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