

## Transformer Services

- *Ensure optimum system performance, efficiency and safety*
- *Avoid substantial financial loss associated with service disruptions*
- *Eliminate unplanned downtime through cost effective testing and maintenance*
- *Ensure ongoing reliability of electrical distribution systems*



### Introduction

Although large power transformers are among the most reliable equipment used in electrical power systems, failures can and do occur. When these unexpected failures occur it can cost you millions in lost production, lost income, and lost customers.

Proper testing and maintenance performed on an annual basis can uncover a problem before a unit

fails. If severe damage results, replacing a transformer can take several weeks resulting in serious financial and productivity losses. In many cases, a transformer can be repaired but only if the problem is caught before it escalates. The key to eliminating these unscheduled outages is proactive testing and maintenance. Information accumulated through routine inspections

and periodic testing will usually provide warning of impending service problems. Recognizing the warnings of an impending failure requires careful analysis of the records to identify significant trends or unusual behavior.

For more than 35 years, Electrical Reliability Services (ERS) has been providing electrical testing, maintenance and engineering services to ensure that your company will have reliable power and avoid expensive outages related to transformer failure. Our transformer services are designed to improve each aspect of system reliability. And, we execute them seamlessly ensuring that your entire facility is protected around the clock, 365 days a year.

### **Substation Maintenance**

Select a single component, a combination of components or an entire program from ERS's menu of on-site transformer and substation services including:

- *Transformer Assembly, Installation & Removal*
- *On-site Inspection & Testing*
- *Insulation Testing*
- *Fluid / Oil Analysis & Condition Trending*
- *Insulating Fluid / Oil Reconditioning*
- *Failure / Fault Analysis*
- *Tap Changer Repair / Replacement*
- *Leak Repairs*
- *Gasket / Bushing Repair*
- *Substation Grounding*
- *Cooling Upgrades*
- *Emergency Services 24x7*

### **Turnkey Installation**

ERS can provide complete turnkey installation, replacement, upgrades or removal and disposal of your electrical equipment. Our technical staff will provide complete design, installation, commissioning and maintenance services for most transformers and related equipment.

### **Testing & Commissioning**

The ongoing efficiency of electrical systems requires proper analysis, interpretation and service recommendations. Experienced ERS engineers can provide complete testing and commissioning of new and/or existing transformers. Highly qualified personnel use the latest technology to assure reliable operation, which include:

- *Function testing of protection and controls*
- *Power factor testing*
- *Transformer turns ratio testing*
- *Insulation resistance testing*
- *Winding resistance testing*

### **Online Predictive Maintenance**

Our online predictive maintenance services can be performed while your system remains energized, eliminating costly shutdowns. By performing the following, we can help you identify when a failure may occur so you can plan an outage instead of dealing with an emergency.

– **Visual Inspections** are performed to inspect cleanliness, cracked insulators and bushings, condition of paint, oil levels, oil leaks, oil/winding temperature gauges, nitrogen pressures, relay targets, and condition of grounds.

– **Infrared Testing** detects heat buildup, loose connections, and defective surge arrestors which are often a precursor to failure.

– **Corona Detection** identifies excessive corona which produces RF interference and may cause an insulator, bushing or surge arrester to fail. Ultrasonic detection can identify excessive corona before a failure occurs.

– **Nitrogen Gas Tests** are performed on nitrogen gas blanketed transformers. Gas samples are taken and two tests are performed including the Percent TCG test which identifies gas in the oil, often times caused by hot spots or overloading. The other test, Percent Oxygen, identifies a high oxygen content in the transformer which may indicate a "wet" atmosphere. Oxygen also accelerates the deterioration of oil.

– **Oil Analysis** is conducted to identify the properties essential to transformer oils and provide a more accurate assessment of their condition.

## Fluid / Oil Processing Services

Fluids and oils circulate in large power transformers to insulate them from high voltage stresses—and they contaminate easily due to leaky seals and corrosion. Increased reliability and performance can result from a rigorous ERS preventive maintenance program that purifies and filters these fluids over the life of the equipment. ERS's advanced mobile oil processing equipment provide vacuum, filtration, degasification, and dehydration of fluids/oils to restore optimum dielectric strength, viscosity and insulation characteristics.

## Oil Analysis

When transformer oil deteriorates, sludge ultimately forms and coats the windings resulting in decreased cooling capacity and degradation of the solid insulation system. Proper oil analysis is critical in determining the operating efficiency of a transformer. Sample testing can include:

- *Dielectric strength*
- *Acidity*
- *Interfacial tension*
- *Color*
- *Sediment*
- *Dissolved gas analysis*
- *Dissolved water in oil analysis*



## Emergency Service

To assist customers in resolving emergency situations, we offer 24x7 on-site emergency service within the specified service areas.

Rely on ERS for critical emergency needs including:

- *Transformer leak repair*
- *Complete transformer gasket replacement*
- *Spill cleanup / recovery*
- *Fault analysis*

### **Emerson—Your Partner in Reliability**

*From installation to operation, only Emerson has the knowledge and experience to seamlessly integrate all the essential services to deliver “high nines” reliability required by today’s critical facilities. Look to us as your partner. We’ll be with you every step of the way with the right combination of technology, people, and services. Contact Emerson to realize the true potential of your assets.*

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