


# Transformer Health Assessment Report

## TR-007: Eta Transmission Autotransformer

### Executive Summary



Parameter	Value
Status	 WARNING
Health Score	58/100
Risk Level	Moderate-High
Scenario	LTC Degradation + Oil Contamination

### Transformer Information

Attribute	Details
Transformer ID	TR-007
Name	Eta Transmission Autotransformer
Location	Northern Transmission Hub
Rating	200 MVA
Voltage	400/220/33 kV
Age	18 years
Last Maintenance	2025-04-18
Next Scheduled	2026-01-25

### Current Operating Parameters

#### Temperature Readings - Elevated

- **Top Oil Temperature:** 78°C (Normal: <65°C)  High
- **Winding Temperature:** 92°C (Normal: <90°C)  High

- **Current Load:** 88% of rated capacity

## Oil Quality Parameters

Parameter	Value	Limit	Status
Moisture Content	42 ppm	<25 ppm	✗ High
Tan Delta	1.78%	<1.0%	✗ High
Breakdown Voltage	32 kV	>50 kV	✗ Low

## Dissolved Gas Analysis (DGA)

Gas	Concentration	Limit	Status
Hydrogen (H <sub>2</sub> )	320 ppm	<100 ppm	✗ High
Methane (CH <sub>4</sub> )	185 ppm	<50 ppm	✗ High
Acetylene (C <sub>2</sub> H <sub>2</sub> )	12 ppm	<3 ppm	✗ Elevated
Carbon Monoxide (CO)	295 ppm	<300 ppm	⚠ Near limit
Carbon Dioxide (CO <sub>2</sub> )	1520 ppm	<2500 ppm	✓ Normal

## Assessment Summary

**Diagnosis:** Combined degradation from Load Tap Changer (LTC) issues and oil contamination. Contact wear in the LTC is causing elevated contact resistance and arcing. Carbon particles from LTC operations have contaminated the main tank oil.

## LTC Assessment

- Contact resistance elevated (>25% above baseline)
- Diverter switch showing wear patterns
- Carbon generation from arcing during tap changes
- Oil in LTC compartment severely contaminated

## Root Cause Analysis

1. **Primary:** LTC contact degradation after 18 years
2. **Secondary:** Oil contamination from LTC arcing
3. **Contributing:** High load operation (88%)

## Risk Factors

- LTC contact degradation requiring maintenance
- Oil contamination affecting insulation
- High load operation stressing system
- Carbon particles reducing oil quality

## Recommendations

1. **Within 14 days:** LTC maintenance and contact replacement
  2. **Required:** Oil filtration for main tank and LTC compartment
  3. **Perform:** Contact resistance testing and timing analysis
  4. **Consider:** Load redistribution to reduce stress
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**Report Generated:** January 12, 2026

**Classification:** Warning - Maintenance Required Within 14 Days