On-line transformer monitoring is an effective technique, which, by means of preventive detection of possible failures, contributes to ensure continuity and reliability of the operation of such equipment, reducing costs and economic losses associated with them. On-line monitoring consists of a set of processes which correspond to field measurement of operation and magnitude parameters, typical of a specific transformer.

**ABB Monitoring Systems**
ABB offers three different systems to ensure our customers receive the optimal a solution corresponding to their specific needs

I) The “Basic System” recommended by ABB consists of a minimum supervision for your strategic units and includes:
- Gas and Moisture in Oil supervision.

II) The “Standard System” is the ideal solution for the supervision of your transformers and consists of:
- Basic On-line Monitoring System
- Transformer status
- Winding hot-spot temperature calculation
- Cooler control
- Thermal aging
- Overload capacity
- Loading forecast
- Transformer temperature balance
- Event handling
- OLTC Supervision (Optional)
- Number operating cycles
- Position
- Contact wear
- Temperature balance
- Revision forecast

III) To ensure maximum reliability, ABB’s “Enhanced System” provides the adequate response with:
- Standard On-line Monitoring System, complete with options,
- Bushing Supervision - Insulation deterioration in condenser core / core surface / porcelain inner surface and detection of capacitance / power factor variation.

**ABB TEC System Features**
With the Standard and Enhanced Systems, ABB proposes its TEC “Transformer Electronic Control”. This equipment combines innovative on-line monitoring features, high capacity intelligent data storage and specialized diagnostic features.

**The main features of ABB TEC system are the following:**
- Integrated Web client-server architecture;
- Updated technology components: sensors, transducers, transmitters, data acquisition platforms, standardized data transfer protocols using TCP/IP, and connection to SCADA System using IEC 60870-5-101/104, IEC 61850 or DNP 3.0 via TEC server.
- Flexible and suitable configuration to the customers’ needs.
- Permanent installation and independent operation.
- Human Machine Interface - Graphs for data presentation results, trend, interpretation, etc. using a standard web page. No special computer required.
Advantages of on-line monitoring

– Monitor a transformer to prematurely detect possible internal failures through supervision and/or diagnostic,
– Operate remotely the main transformers in networks
– Monitor a strategic transformer supplying important loads, where shutoff may result in severe economic losses
– Extend overall life time by understanding and controlling the load versus ageing process
– Drastically reduce the risk of an unplanned catastrophic failure on strategic units
– Plan for maintenance during low load season,
– Keep a sick unit in service at reduced load while executing a repair or replacement.

Customer Success Story

– A 30 year-old Generator Step-up Transformer (40 MVA, 220 kV) was gassing above 30 % of the nominal load current because of its aged insulation system. The transformer had been kept wet and run overloaded for many years
– Owner wanted to keep the unit running during a 6 months peak load season to deliver electricity to important customers before its replacement
– Installing a monitoring system on the transformer and supervising the evolution of the unit remotely from an ABB service centre, allowed the owner to support its challenge

Recognized benefits:

– ABB’s On-Line Monitoring solution allowed the owner to keep the transformer in service until replacement 18 months later
– About 6 months of production at 30% of nominal load (12 MVA) was sufficient to cover needs for the local area
– Owner avoided paying penalties for non delivery of energy
– Overall satisfaction of the owner and of the end-user.

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